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# Infant Mortality in Memphis

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UNITED STATES DEPARTMENT OF LABOR  
1936



UNITED STATES DEPARTMENT OF LABOR  
FRANCES PERKINS, Secretary  
CHILDREN'S BUREAU . . . Katharine F. Lenroot, Chief

# Infant Mortality in Memphis

BY  
ELLA OPPENHEIMER, M. D.



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## *Letter of Transmittal*

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UNITED STATES DEPARTMENT OF LABOR,  
CHILDREN'S BUREAU,  
*Washington, August 19, 1936.*

MADAM: This report is presented as an example of the degree to which an analysis of Census statistics and local studies, in the light of a careful appraisal of public-health and clinical facilities for maternal and infant care, may make possible an understanding of those conditions in a city which are associated with a high infant mortality rate and point to concrete measures which are indicated to improve it.

In the fall of 1935 Dr. Oppenheimer submitted the report to those in Memphis who had requested the study and discussed with them what could be done to put into effect the measures recommended. As a result a Director of Maternal and Infant Hygiene has been appointed in the Memphis Department of Health and a beginning has been made in carrying out many of the recommendations.

Respectfully submitted.

KATHARINE F. LENROOT, *Chief.*

HON. FRANCES PERKINS,  
*Secretary of Labor.*



# Infant Mortality in Memphis

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## *Introduction*

Memphis, Tenn., was reported by the United States Bureau of the Census as having the highest infant mortality rate of any city of 100,000 or more population in the United States birth-registration area in 1932. In 1933 and 1934 its infant mortality rates reached an even higher level than in 1932. Local concern over this situation led to a request to the United States Children's Bureau to make a study of the causes of the high infant mortality rate of Memphis and recommendations as to measures for decreasing it.

The following joined in the request: The Mayor of Memphis, the Superintendent of the Department of Health, the President of the Shelby County Medical Society, the Superintendent of the Memphis General Hospital, the Professor of Pediatrics at the University of Tennessee (who is also Chief of the Pediatric Service of the Memphis General Hospital), the Dean of the Medical School of the University of Tennessee, and the President of the Memphis Chamber of Commerce.

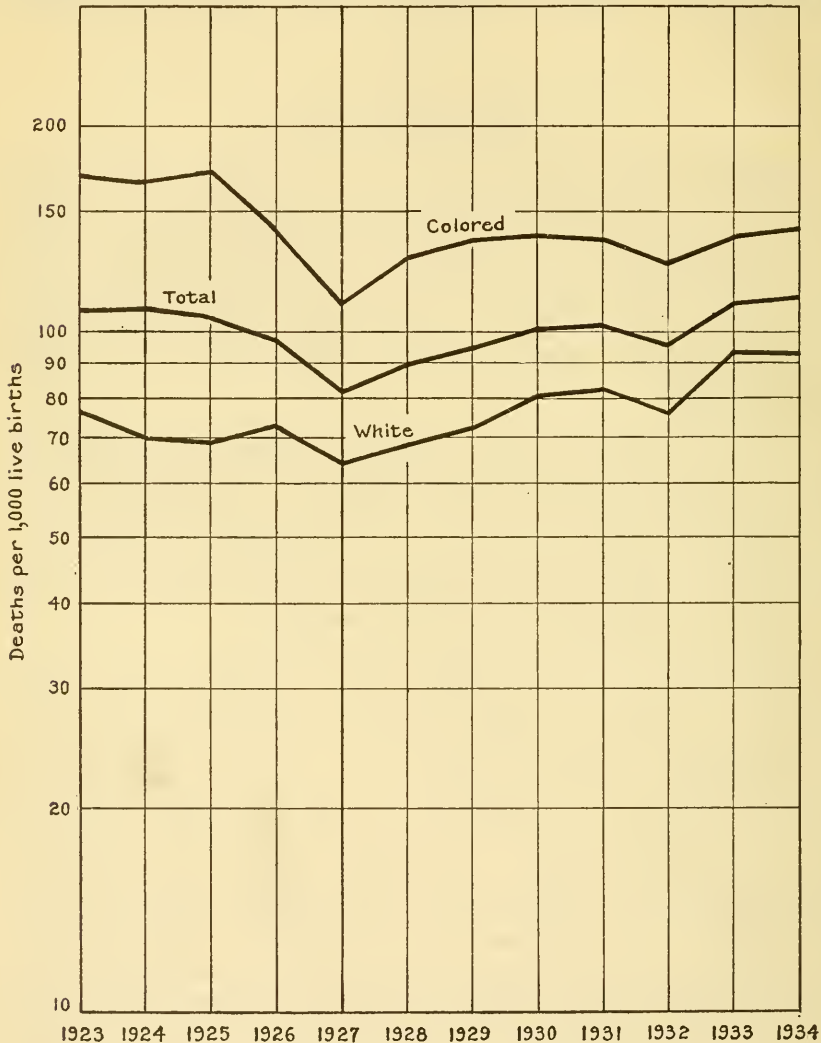
This report presents the findings of a brief investigation made in the spring of 1935 the purpose of which was to determine, to the degree possible on the basis of available data, the outstanding factors in the high infant mortality rate in Memphis, and to make whatever immediate recommendations seemed indicated as to activities which might be expected to lower it. It represents in no sense a complete analysis of the infant-mortality situation in Memphis, but only what was possible with the material available. Because similar causes are responsible for maternal deaths and many deaths in early infancy, maternal mortality and facilities for maternal care were also considered. The investigation also had the purpose of determining what kind of further studies, if any, were indicated in order to clarify the problem and to point the way toward the development of a program for maternal and infant health in Memphis which would adequately meet specific local needs.

The conclusions of the report are based on analysis of the United States Bureau of the Census statistics for Memphis since 1927 and of local statistics made available by the Memphis Department of Health; on



material culled from reports and studies that had been made locally which seemed to have a bearing on the problem; on information gathered in Memphis from interviews with those responsible for the public-health, medical, and social services, from discussion of local problems and needs

Chart 1.—Mortality in the First Year of Life Among White and Colored Infants; Memphis, Tenn., 1923-34.



Source: 1923-26, Memphis Department of Health; 1927-34, U. S. Bureau of the Census.

with obstetric and pediatric medical groups and with the public-health nurses and nurses in charge of maternity and pediatric wards of hospitals, and from visits to hospitals, health centers, institutions caring for unmarried mothers, orphanages, and day nurseries. Conditions described represent the situation in the spring of 1935.

# General Considerations

## Trend of Infant Mortality in Memphis

### Trend in mortality in the first year.

From 1923 to 1927 the infant mortality rate in Memphis <sup>1</sup> decreased appreciably, but since 1927 it has been increasing to such an extent that the United States Bureau of the Census rate for 1934 was 40 percent higher than the rate for 1927. In both 1933 and 1934 the rate was even higher than in 1923.

When the trend in the rates for white and for colored infants separately is considered, it is found that the rate for white infants, though always much lower than the rate for colored infants, had shown a smaller decrease (16 percent) from 1923 to 1927 than the rate for colored infants (36 percent), and from 1927 to 1934 had increased 45 percent as against 32 percent for the colored. (Chart 1. See also table 1, p. 81.) This increase brought the 1934 rate for white infants considerably above even the 1923 figure, whereas the rate for colored infants did not approach the high rate of 1923 by a considerable margin.

The upward trend in infant mortality in Memphis is in contrast to the trend of the general death rate for the same period, which for both white and colored has been slightly downward from 1929 to 1933.

GENERAL DEATH RATES, <sup>1</sup> MEMPHIS, TENN., 1927-33

Year	Total	White	Colored
1927.....	18.2	( <sup>2</sup> )	( <sup>2</sup> )
1928.....	18.6	15.5	23.6
1929.....	18.9	15.8	23.8
1930.....	17.3	13.5	23.5
1931.....	16.6	13.6	21.5
1932.....	16.8	13.6	22.0
1933.....	16.7	13.3	22.0

<sup>1</sup> Deaths from all causes per 1,000 estimated population.

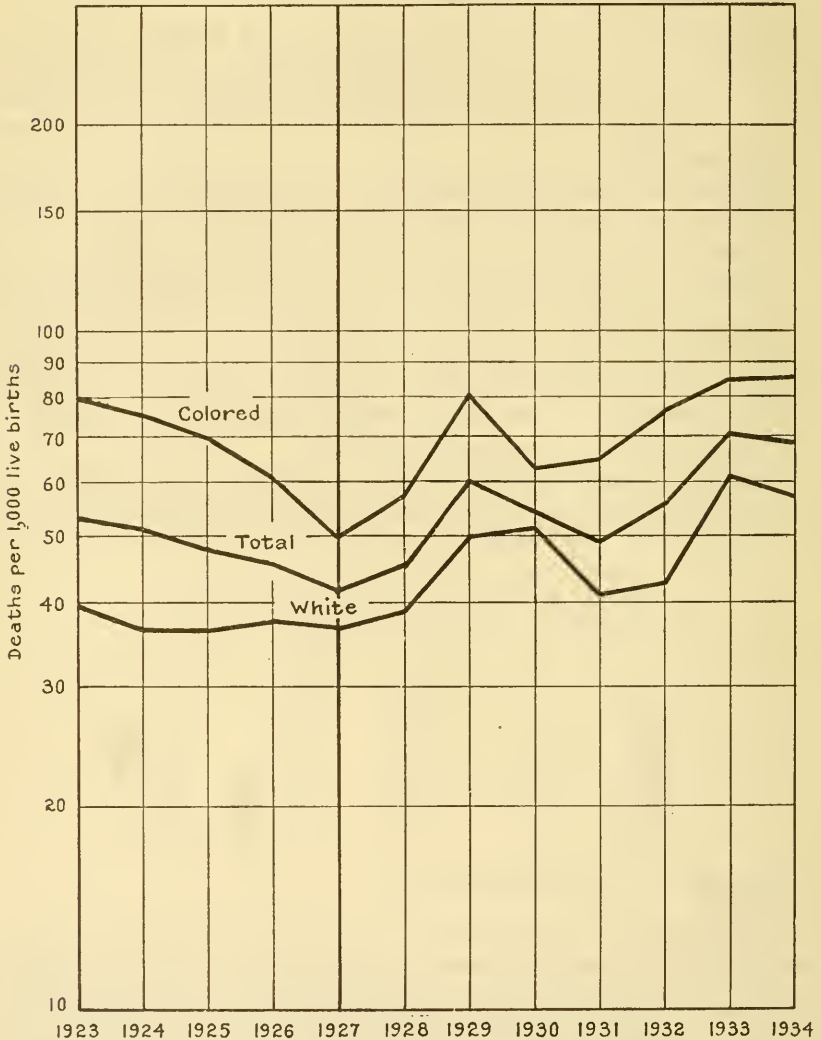
<sup>2</sup> Not reported.

<sup>1</sup> Infant mortality rates for Memphis based on U. S. Bureau of the Census statistics and comparable with other cities are available only since 1927, when Tennessee was admitted to the United States birth-registration area. Statements in the Survey of Health Problems and Facilities in Memphis and Shelby County, Tenn., for the year 1929 made by the American Public Health Association, and in an unpublished Survey and Appraisal of Health Activities in the City of Memphis, Tenn., 1931, by H. E. Handley, M. D., indicate that between 1922 and 1927 birth registration in Memphis was sufficiently complete to make the rates issued by the local department of health reasonably valid.

**Trend in neonatal mortality.**

Before 1928 the neonatal death rate (mortality among infants in the first month of life), like the total infant mortality rate, had been decreasing appreciably (the 1927 rate was 22 percent lower than that for

Chart 2.—Mortality in the First Month of Life Among White and Colored Infants; Memphis, Tenn., 1923–34



Source: 1923–26, Memphis Department of Health; 1927–34, U. S. Bureau of the Census.

1923), but since 1927 the trend in the mortality during the first month of life, as well as in the entire first year, has been upward. The neonatal rate for 1934 was 67 percent higher than the neonatal rate for 1927. (Chart 2. See also table 1, p. 81.)

The neonatal rate for white infants in the earlier period (1923-27) had decreased slightly (9 percent), while the neonatal rate for colored infants had decreased markedly (37 percent). This corresponds to the trend during this period in the total mortality rates for white and for colored infants. From 1927 to 1934 increases appeared in both white and colored neonatal mortality, the rate in 1934 being 59 percent higher than in 1927 for white infants and 73 percent higher for colored infants.

So great has been the increase in neonatal mortality since 1927 that the 1933 and 1934 rates for all infants and for white infants were appreciably higher than they were even in 1923. The rates for colored infants had again reached approximately the same level as in 1923 (chart 2).

#### **Trend in mortality in the second to the twelfth month.**

For infants surviving the first month the mortality rate during the second to the twelfth month had shown a decrease in 1926 and a further marked decrease in 1927 from previous years. Since 1927 there has been wide variability from year to year in mortality in the second to the twelfth month with apparently neither an upward nor a downward trend. The rate for 1934 (46.9) was slightly higher than that for 1927 (41.0), though lower than that for 1923 (57.6).

The mortality among colored infants in the second to the twelfth month in 1927 was markedly lower than that for the period 1923-25. Since 1927 there has been much variability, but a slight downward trend since 1930. The 1934 rate (61.9) was about the same as that for 1927 (61.2), having increased over the minimum rate of 54.5 in 1932, which was very much lower than the rates of previous years.

Mortality in the second to the twelfth month among white infants showed a slight decrease during the 1923-27 period. Since 1927 it has shown a general upward trend that has brought the 1934 rate (37.4) practically to the level of 1923 (38.3). (Chart 3. See also table 1, p. 81.)

#### **Sharp increase in infant mortality in 1933 and 1934 over 1932.**

Chart 1 shows that the infant mortality rate rose sharply in 1933 over 1932 and that the 1933 increase was maintained in 1934. The increase in 1933 and 1934 over 1932 was almost all in the neonatal period, although there was a slight increase in the second to twelfth month period in both 1933 and 1934 (charts 2 and 3).

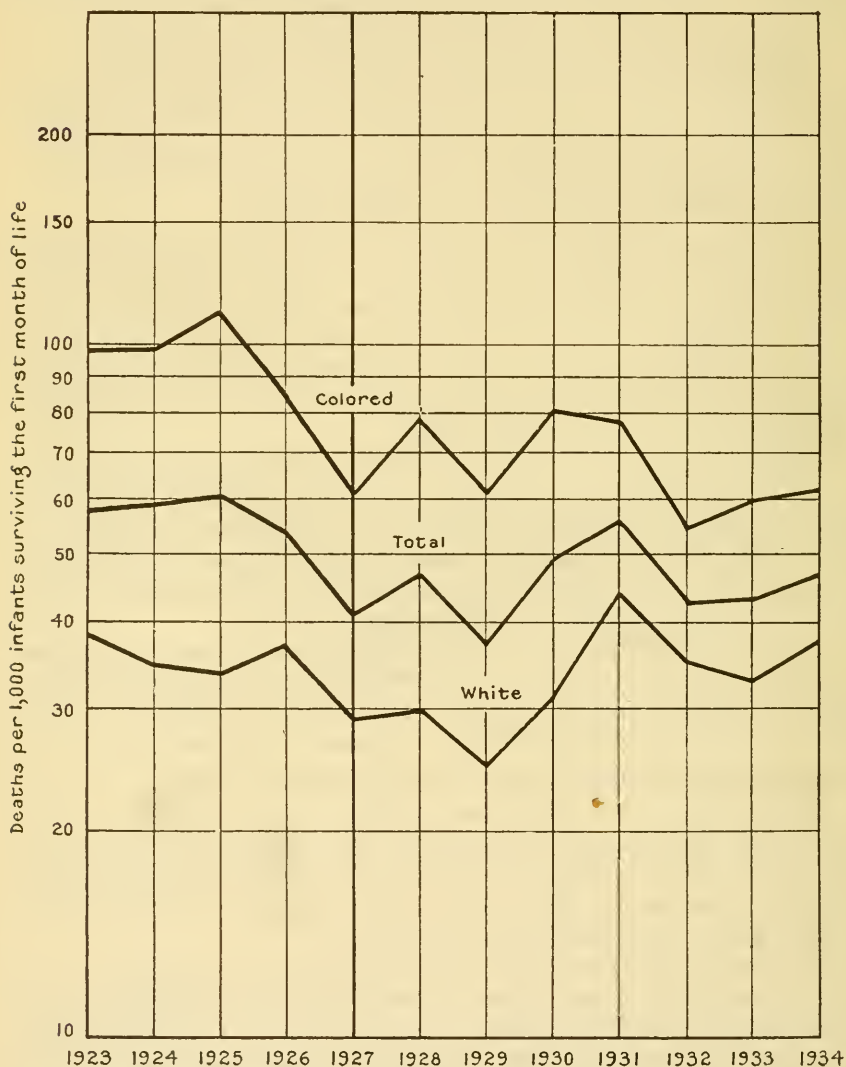
The 1933 and 1934 increase over 1932 in the infant mortality rate was greater among white than among colored infants, and this difference was accentuated in the neonatal rates. For the second to the twelfth month the rates among white infants remained practically stationary in 1933 and 1934 as compared with 1932, while those among colored infants went up slightly.

#### **Causes of upward trend in neonatal mortality.**

A detailed study of neonatal mortality by periods of the first month of life reveals that the marked increase in neonatal mortality in 1933 and 1934 as compared with previous years occurred during the period between

the end of the first week and the end of the month. (Chart 4. See also table 2, p. 81.) Mortality during this period among white infants had been higher in 1930 to 1932 than in 1927 to 1929, and among the

Chart 3.—Mortality in the Second to the Twelfth Month of Life Among White and Colored Infants; Memphis, Tenn., 1923-34



Source: 1923-26, Memphis Department of Health; 1927-34, U. S. Bureau of the Census.

colored it had been higher in 1929 to 1932 than in 1927 and 1928; but the increase in 1933 and 1934 over 1932 was almost threefold among white infants and twice as great or more among the colored.

The earlier death occurs, the more likely it is to be associated with natal and prenatal causes rather than with external environmental

conditions. That environmental conditions are largely responsible for the marked upward trend in neonatal mortality in Memphis, especially in 1933 and 1934, is suggested by the large increase in mortality during the period between 1 week and 1 month of life, and this suggestion is corroborated when neonatal mortality in Memphis is analyzed by cause.

Although natal and prenatal causes, which largely predominate, have shown an upward trend among both white and colored infants since

Chart 4.—Mortality in Certain Periods of the First Month of Life Among White and Colored Infants; Memphis, Tenn., 1927-34

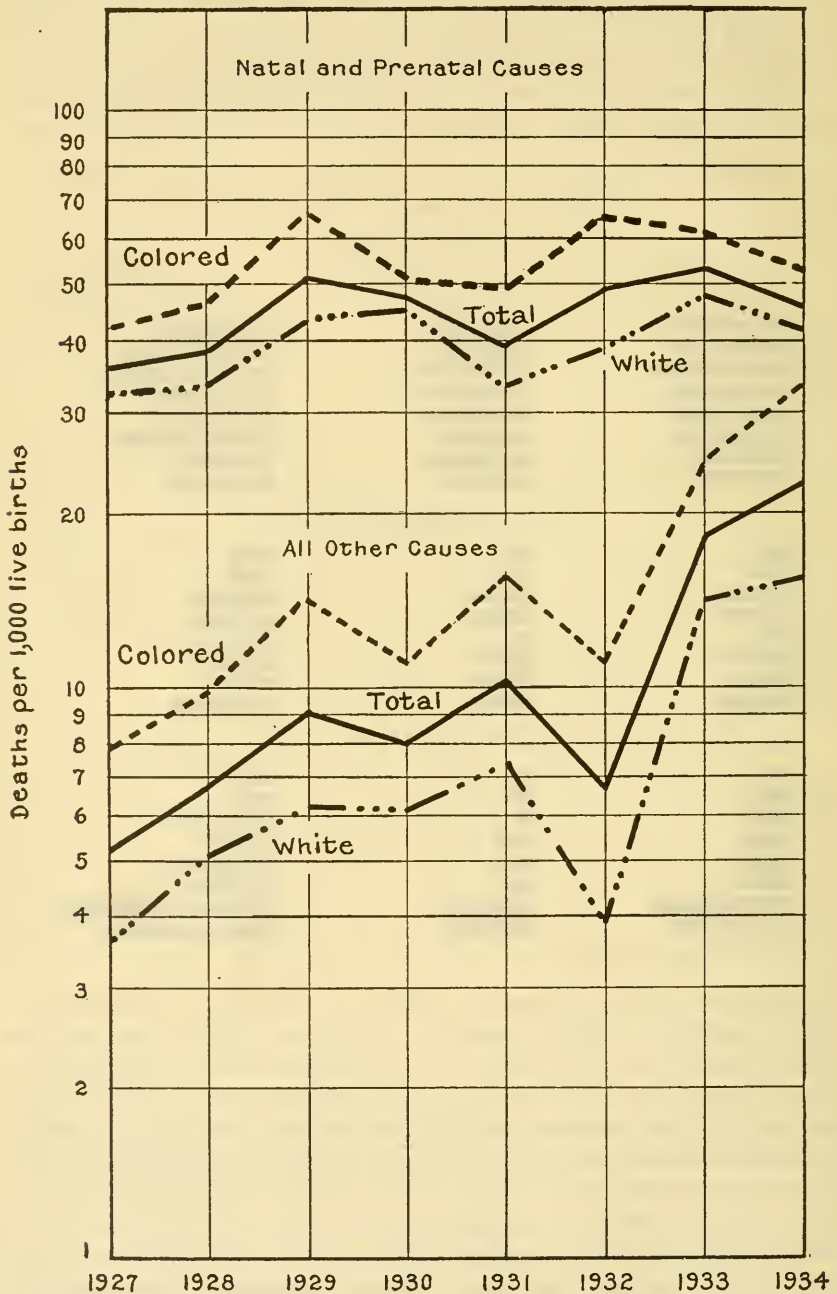


Source: U. S. Bureau of the Census.

1927, the percentage increase in the neonatal rates from natal and prenatal causes in 1934 over 1927 accounts for only two-fifths of the increase in the neonatal mortality rates. In 1933 the increase over 1932 in the neonatal rate from natal and prenatal causes accounted for only about one-fourth of the increase over 1932 in the total neonatal rate, while 1934 showed an increase as compared with 1932 in the total neonatal rate in spite of a decrease in that part of the rate due to natal and prenatal causes. The marked increases in the neonatal rates in 1933 and 1934 are due in very large part to striking increases in the mortality from other causes than natal and prenatal. These increases are apparent among both white and colored infants but are more striking among the white infants. (Chart 5. See also table 3, p. 82.)



Chart 5.—Mortality in the First Month of Life From Natal and Prenatal Causes and From All Other Causes Among White and Colored Infants; Memphis, Tenn., 1927-34



Source: U. S. Bureau of the Census.



**Causes associated with upward trend among white infants and slight downward trend among colored infants in the second to twelfth month period.**

Study of the causes of mortality in the second to the twelfth month period makes it clear that the upward trend from 1927 to 1934 in mortality among white infants surviving the first month was associated largely with increasing mortality in this period of the first year from gastrointestinal diseases and from natal and prenatal causes. The slight downward trend apparent since 1930 among colored infants surviving the first month was associated largely with decreasing mortality in the second to the twelfth month from respiratory diseases and epidemic and communicable diseases; gastrointestinal diseases show marked variability from year to year. (Charts 6, 7, and 8. See also table 4, p. 82.)

*The upward trend in infant mortality in Memphis since 1927 has been largely the result of a marked increase in neonatal mortality among both white and colored infants, which has been associated in small part with an increase in mortality from natal and prenatal causes, and in large part with an increase in mortality from other than natal and prenatal causes that was especially great in 1933 and 1934 as compared with previous years.*

### **Comparison of Infant Mortality of Memphis With That of Other Cities**

**Infant mortality, 1927-34, in Memphis and in other cities of 250,000 to 350,000 population.**

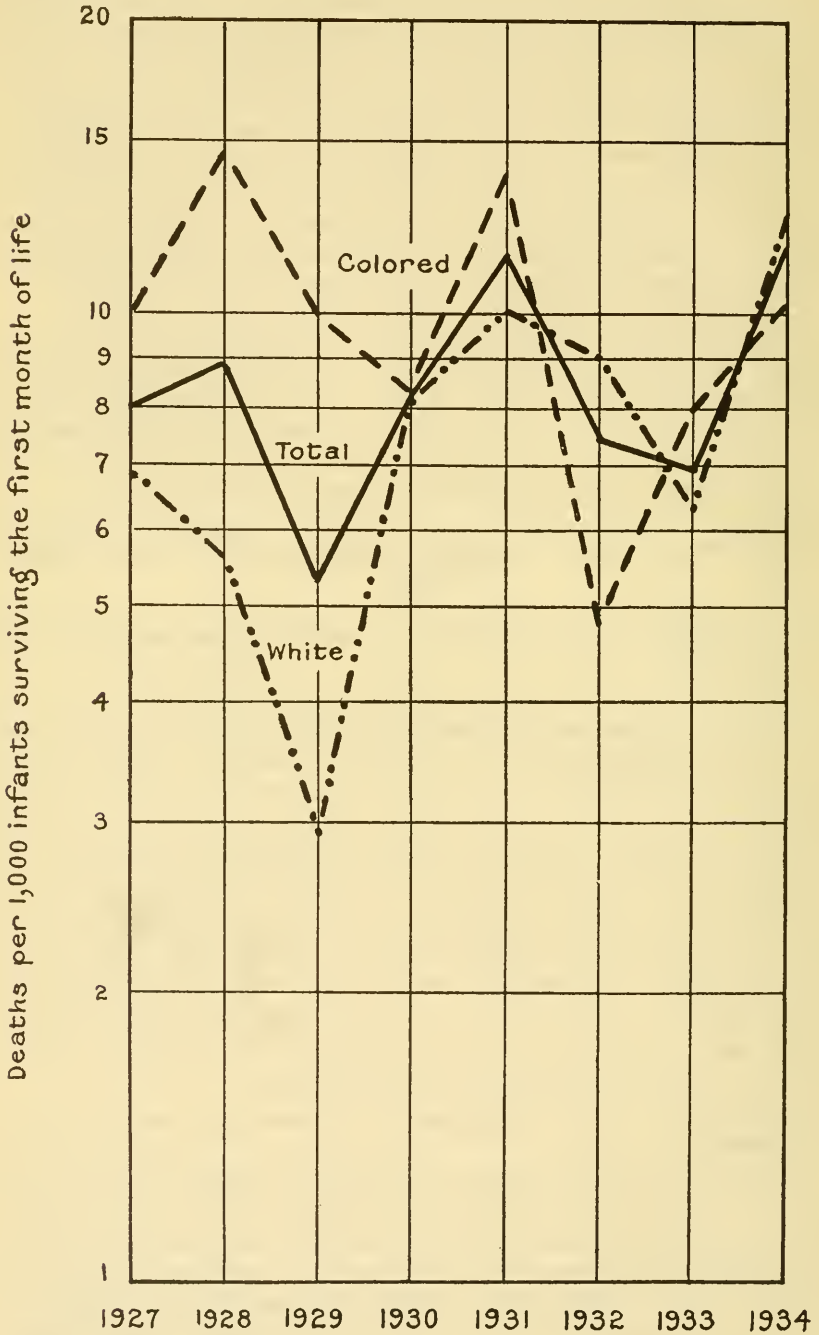
Comparison of the infant mortality rates of Memphis with those of 15 cities of comparable size (charts 9 and 10; see also tables 6, 7, and 8, pp. 83-84) shows that the Memphis rates for all infants have exceeded those of other cities of its size, not only in 1934 but in a number of other years since 1927. The Memphis mortality rates for colored infants, with few exceptions, have been higher than the mortality rates for colored infants in cities with 25,000 or more colored population for which colored and white rates are given separately; the rates among white infants in these cities have been lower than the Memphis rates in each year since 1930. The mortality among white infants in Memphis, with few exceptions, has been even greater than among all infants in cities of comparable size that have less than 25,000 colored population and do not have white and colored rates listed separately.

**Trend in infant mortality in Memphis and in three other Southern cities, 1928-34.**

Although the Memphis infant mortality rate ranked high among the rates of all cities of its size in 1927 and 1928, it was not strikingly different from that of Birmingham in 1927 and 1928 nor from that of Louisville in 1928; it was close to that of Atlanta in 1928 (the Atlanta rate for 1927 is not available). It is, therefore, especially noteworthy that a striking divergence has developed between the infant mortality rates

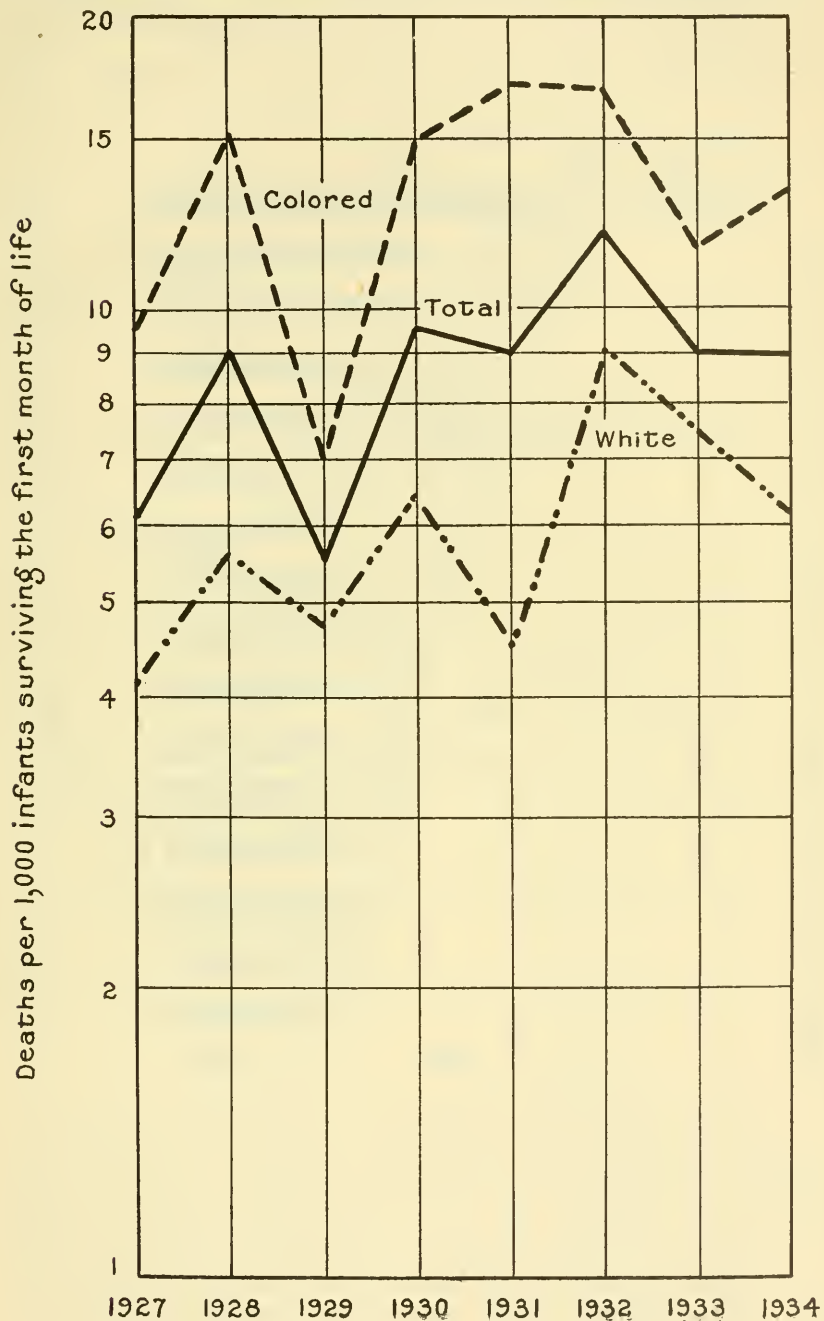
## INFANT MORTALITY IN MEMPHIS

Chart 6.—Mortality in the Second to the Twelfth Month of Life from Gastrointestinal Diseases Among White and Colored Infants; Memphis, Tenn., 1927-34



Source: U. S. Bureau of the Census.

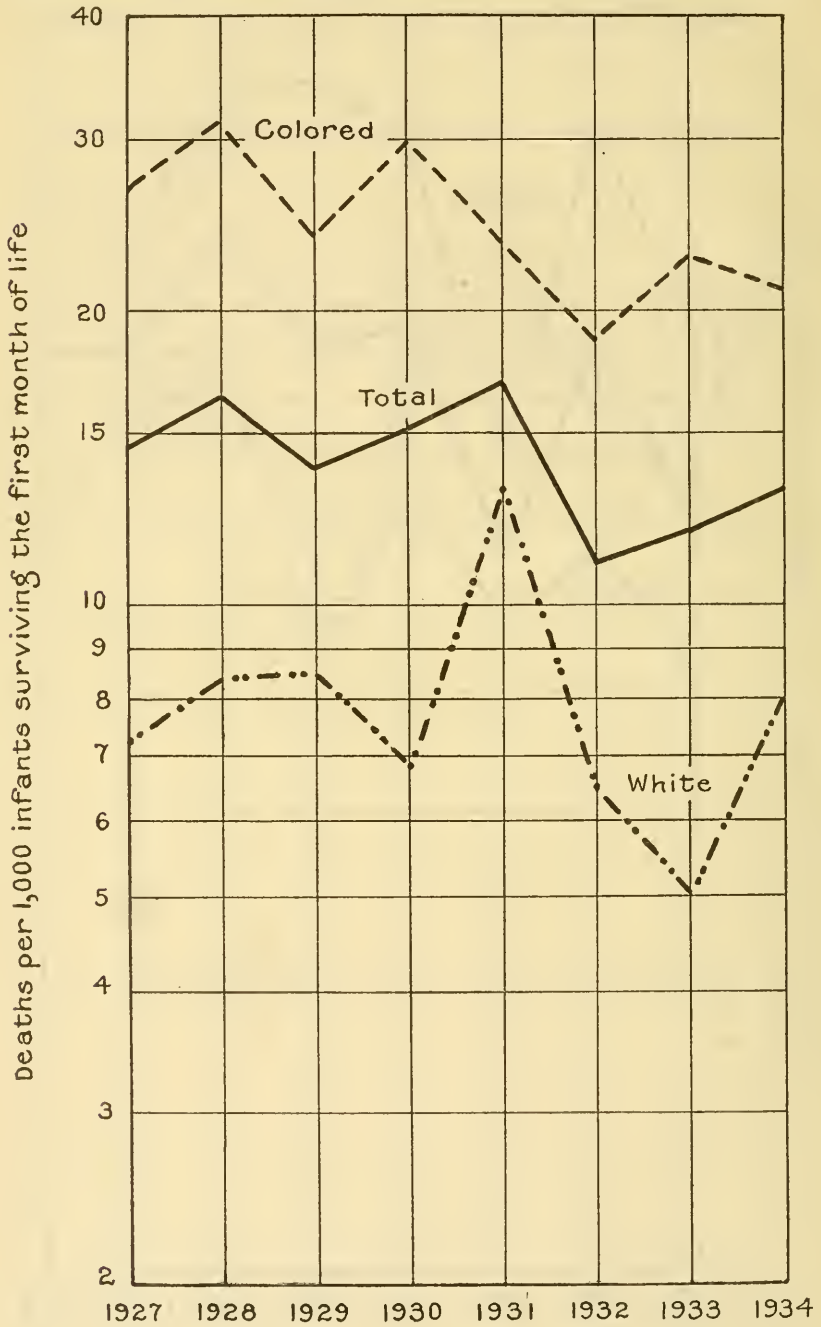
Chart 7.—Mortality in the Second to the Twelfth Month of Life From Natal and Prenatal Causes Among White and Colored Infants; Memphis, Tenn., 1927-34



Source: U. S. Bureau of the Census.

## INFANT MORTALITY IN MEMPHIS

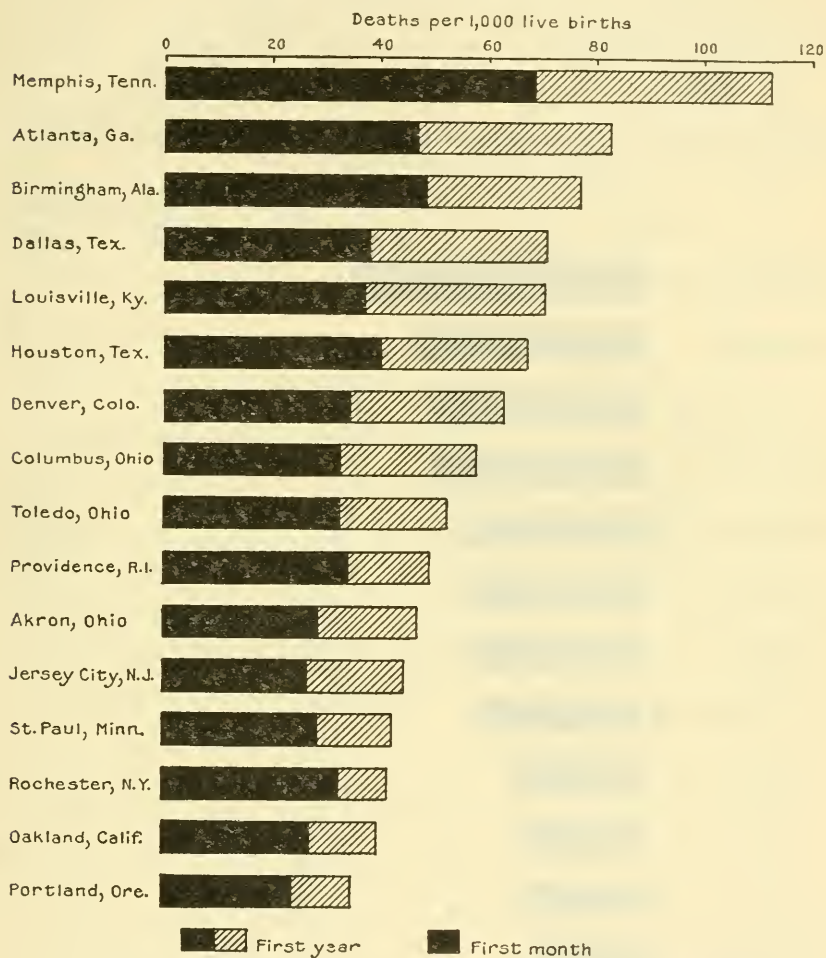
Chart 8.—Mortality in the Second to the Twelfth Month of Life From Respiratory Diseases Among White and Colored Infants; Memphis, Tenn., 1927-34



Source: U. S. Bureau of the Census,

of these three cities and of Memphis since then—a divergence which has occurred in the rates for the first year, the first month, and the second to the twelfth month of life and in the rates for each of these periods

Chart 9.—Mortality in the First Month and the First Year of Life in Cities With 250,000 to 350,000 Population, 1934

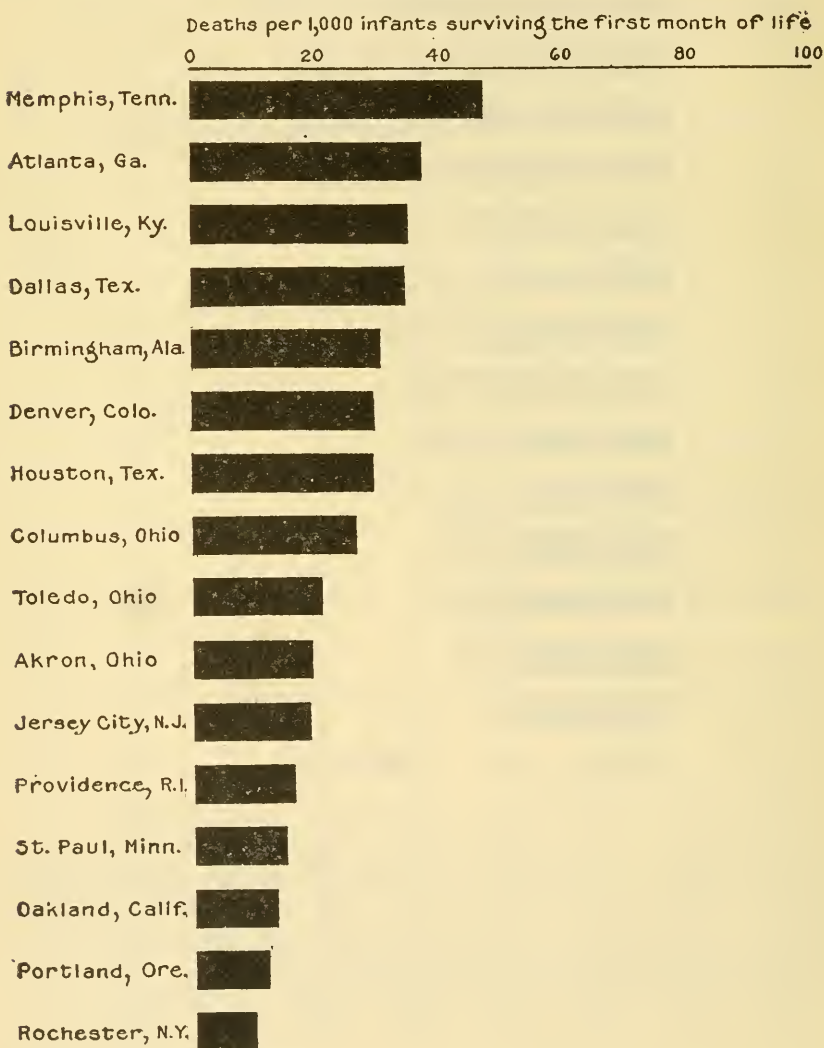


Source: U. S. Bureau of the Census.

of the first year among white and colored infants separately as well as among all infants. Although all the rates of the three cities combined except the colored neonatal rates rose in 1933 and 1934 over 1932, the Memphis mortality rates in 1934 were higher than those of the three cities by the following percentages (table 9, p. 85):

	<i>Percent</i>
First year of life.....	46
White.....	37
Colored.....	43
First month.....	55
White.....	45
Colored.....	55
Second to twelfth month.....	37
White.....	28
Colored.....	33

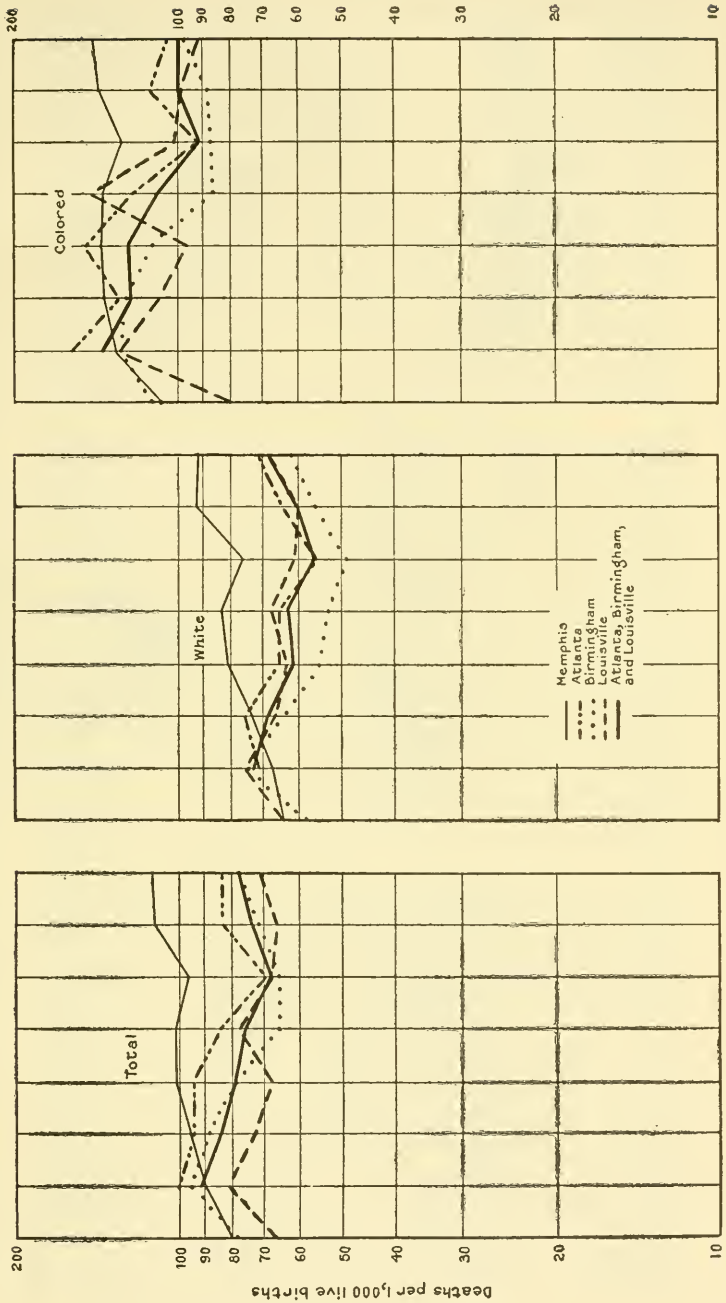
Chart 10.—Mortality in the Second to the Twelfth Month of Life in Cities With 250,000 to 350,000 Population, 1934



Source: U. S. Bureau of the Census.



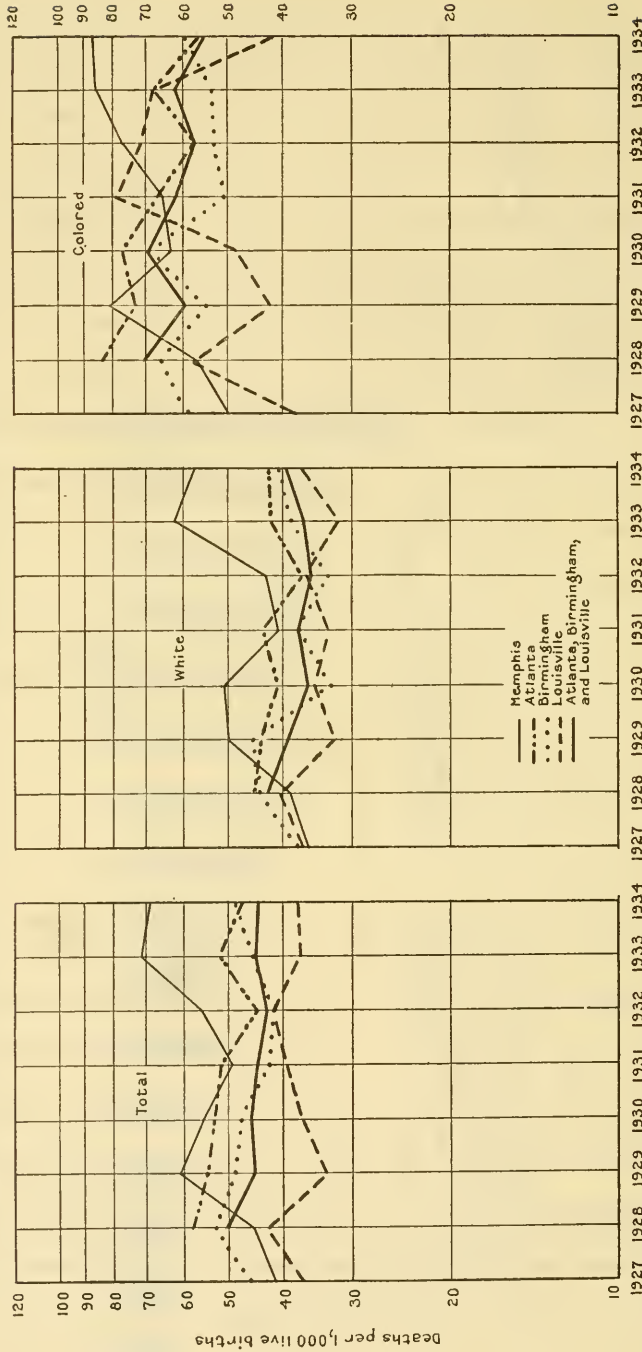
Chart 11.—Mortality in the First Year of Life Among White and Colored Infants in Memphis, Atlanta, Birmingham, and Louisville, 1927-34



Source: U. S. Bureau of the Census.

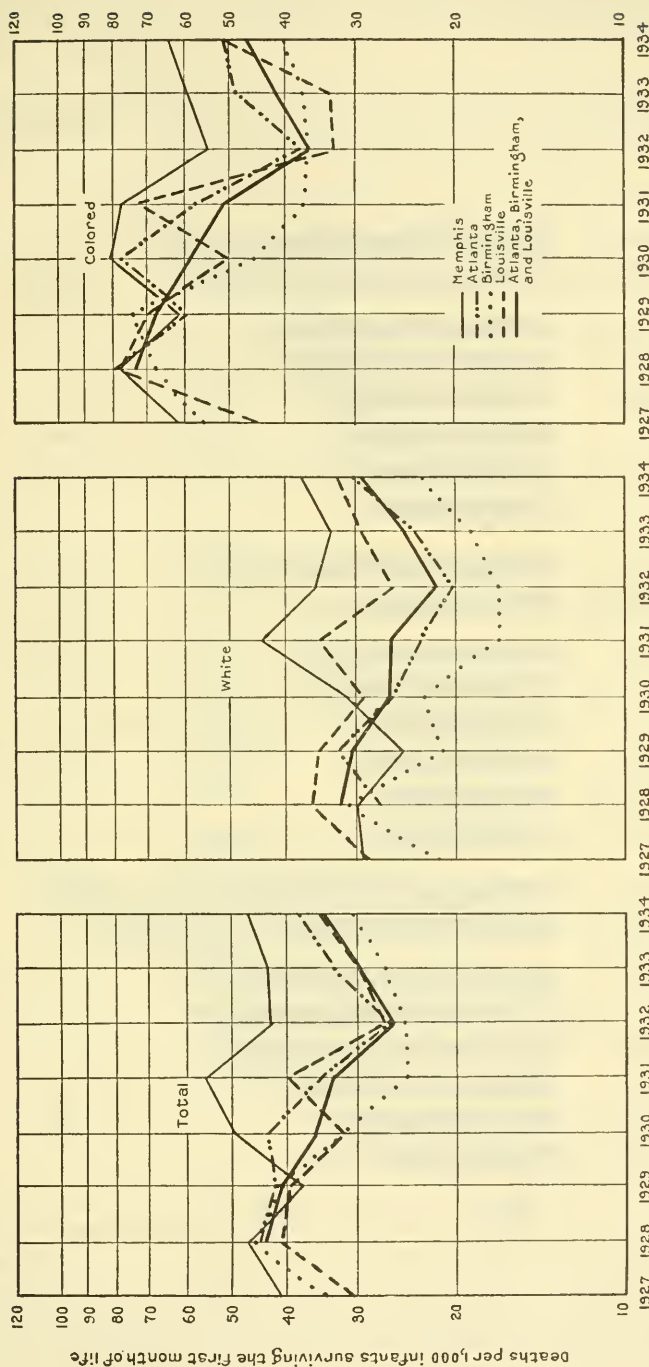


Chart 12.—Mortality in the First Year of Life Among White and Colored Infants in Memphis, Atlanta, Birmingham, and Louisville, 1927-34



Source: U. S. Bureau of the Census.

Chart 13.—Mortality in the Second to the Twelfth Month of Life Among White and Colored Infants in Memphis, Atlanta, Birmingham, and Louisville, 1927-34



Source: U. S. Bureau of the Census.

Charts 11-13 show the upward trend since 1928 in the mortality rates for the first year and the first month in Memphis in contrast to the downward trend in the rates for the first year and relatively stable rates for the first

Chart 14.—Mortality in the First Month of Life From All Causes and From Natal and Prenatal Causes Among White and Colored Infants in Cities With 250,000 to 350,000 Population and 25,000 or More Colored Population, 1934

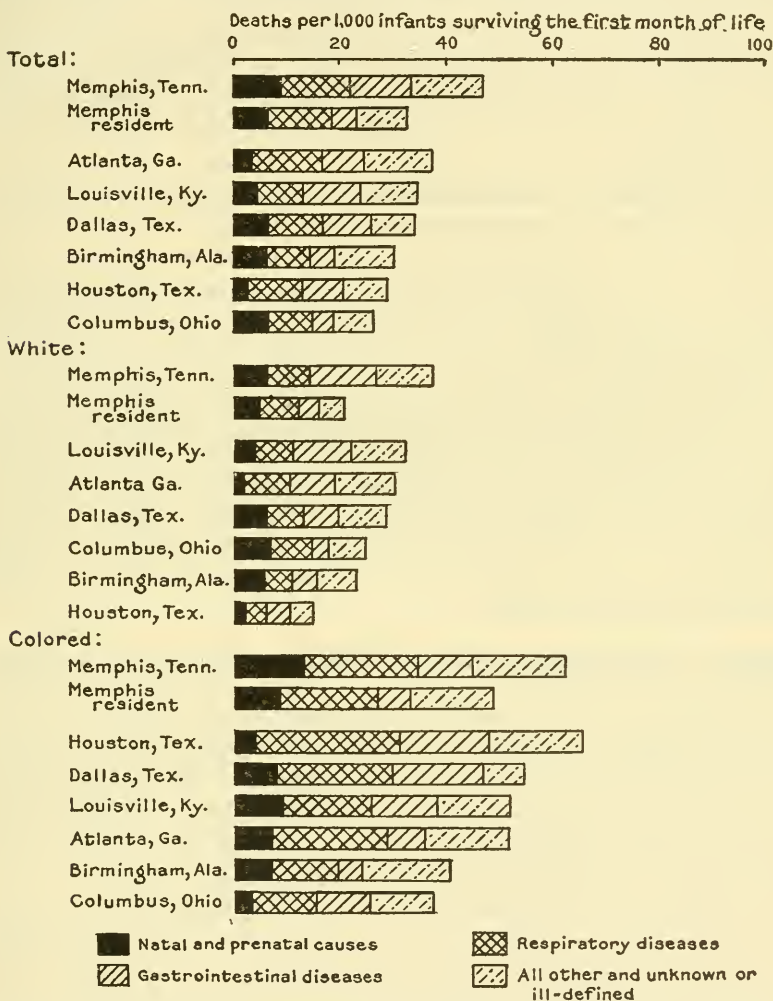


Source: Memphis resident rates, Memphis Department of Health; all others, U. S. Bureau of the Census.

month in the three Southern cities combined. The picture of variability in the Memphis rates for infants in the second to the twelfth month period stands out against a marked decrease in the three Southern cities combined

during the period 1928-32. Although the second to twelfth month mortality in the three cities combined showed a marked increase in 1933 and 1934, this rate was still much lower than the second to twelfth month rate of Memphis in these years.

Chart 15.—Mortality in the Second to the Twelfth Month of Life From Specified Groups of Causes Among White and Colored Infants in Cities With 250,000 to 350,000 Population and 25,000 or More Colored Population, 1934



Source: Memphis resident rates, Memphis Department of Health; all others, U. S. Bureau of the Census.

**Causes of neonatal mortality in Memphis and in other cities of comparable size.**

Differences between Memphis and the other cities of its approximate size appear both in neonatal mortality and in the mortality from the second to the twelfth month; but the marked excess of the Memphis neonatal mortality rate in 1934 over that even of the city next highest is

noteworthy, and the reason for the difference is evident when the causes of neonatal mortality in Memphis and in the other cities are compared. Such a comparison of the mortality from natal and prenatal causes and from other causes during the first month of life in Memphis and in cities with separate rates for white and colored in 1934 is shown in chart 14 and in table 11 (p. 86). Although the Memphis neonatal mortality from natal and prenatal causes among white and in most instances among colored infants was higher than that of the cities with which it is compared, the marked difference in neonatal mortality between Memphis and the other cities in 1934 was due to the fact that mortality rates from other than natal and prenatal causes among both white and colored infants were more than twice as high in Memphis as the highest rate from such causes in any of the other cities.

#### **Causes of mortality in the second to the twelfth month in Memphis and in other cities of comparable size.**

In the second to twelfth month period the most striking difference in causes of mortality between Memphis and the cities with which it is compared is in mortality from gastrointestinal diseases among white infants, which in 1934 was very much higher in Memphis than in any of the other cities except Louisville. It is of interest that many of the other cities have, like Memphis, a high mortality from respiratory diseases among colored infants in the second to twelfth month period, and that among the colored many of the cities have at least as high a mortality as Memphis from gastrointestinal diseases. Mortality from natal and prenatal causes among colored infants during this period of the first year of life was higher in Memphis in 1934 than in the other cities. (Chart 15. See also table 12, p. 86.)

#### **Residence of Mothers in Relation to Infant Mortality in Memphis**

Memphis is the trading and hospital center for a large area in western Tennessee and in Arkansas and northern Mississippi—an area very poorly equipped with health and medical services. Infants are brought to Memphis for medical care, and some of these die there. Women from elsewhere come to Memphis for delivery, and some of the infants born to nonresident mothers in Memphis die there early in life.

Memphis cannot be relieved of all responsibility for these deaths unless it is demonstrated that they are due to causes entirely beyond the control of those in the city who care for these patients. Careful inquiry must be made as to conditions in Memphis that may have a bearing on the deaths occurring among the newborn infants of nonresident as well as of resident mothers, for the same influences may be responsible for some deaths in both groups. A similar inquiry must be made regarding deaths of nonresident sick infants brought into Memphis for care.

But if women come into hospitals in the city for delivery without having planned for it and without affording the physician opportunity



to give them adequate prenatal care, or if they come in an emergency, the city cannot be held responsible for a lethal outcome provided the care given under the circumstances meets accepted standards. The same holds true when sick babies are brought from outside the city for hospital care. Many infant deaths can be prevented by care early in illness; delay is often fatal, and the city certainly cannot be held responsible for the deaths of infants brought in seriously ill and beyond effective medical help.

It is, however, important first of all to determine whether deaths and births of infants of nonresident mothers affect what may be called crude infant mortality rates (based on all infant deaths and all live births in the city) to distinguish them from rates based on residence. Are the deaths and births of nonresidents responsible for the unusually high infant mortality of Memphis compared with other cities? If so, do they affect both the rates for the first month and the rates for the second to the twelfth month? Do they affect the rates among colored and white alike?

#### **Mortality among infants of resident mothers in Memphis.**

Comparison of infant mortality rates based only on deaths of infants of resident mothers and on live births to resident mothers in Memphis, with crude infant mortality rates would reveal the degree to which the births in Memphis to nonresident mothers and the deaths of such infants, and also the deaths in Memphis of infants not born there, are influencing the crude rates. A study of such resident infant mortality rates over a period of years would indicate the extent to which their trends have followed those of the crude rates.

#### **Comparison of resident and crude infant mortality rates in 1930-32 and in 1934.**

Unfortunately, reasonably valid mortality rates for infants of resident mothers are available only for the years 1930-32 combined and for 1934. Resident mortality rates by cause are available only for 1934.<sup>2</sup> For both these periods the resident infant mortality rates for all infants and for white infants were significantly lower than the crude mortality rates. The resident neonatal mortality rates were slightly lower than the crude rates, but the differences were not statistically significant. The resident mortality in the second to the twelfth month of life was, however, significantly lower for all infants and for white infants than the crude mortality for these months. (Chart 16. See also table 13, p. 87.)

*For the neonatal period resident mortality rates from natal and prenatal causes and from other causes were not significantly different in 1934 from the respective crude rates. Nor were there significant differences between the resident and the crude mortality when the figures for the first month were broken up into different age periods.*

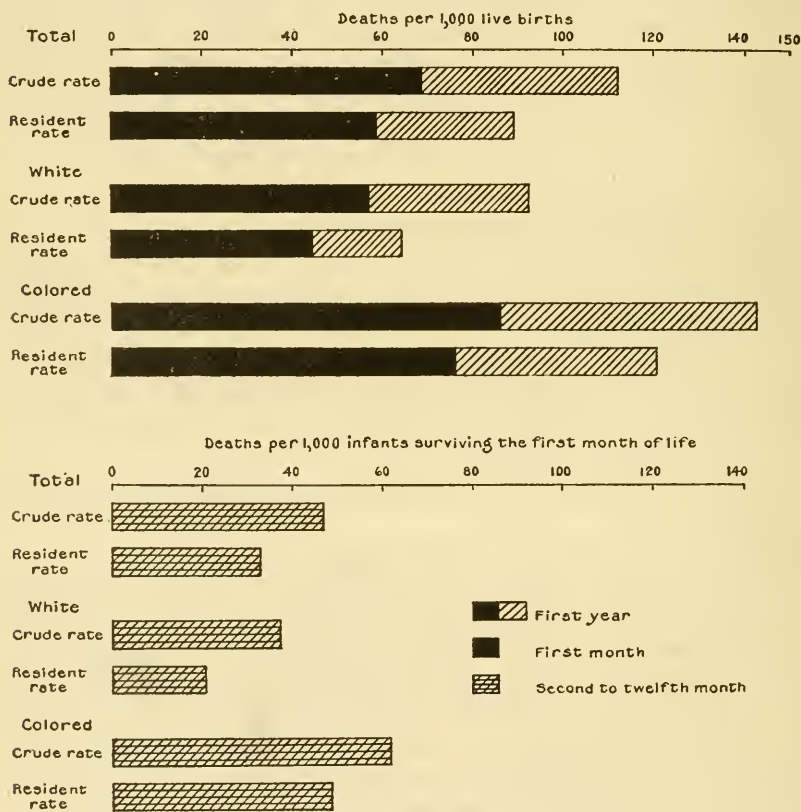
<sup>2</sup>For detailed discussion of resident infant mortality in Memphis see Appendix 1, p. 77.

In the second to the twelfth month period, however, the strikingly lower resident rate in 1934 from gastrointestinal diseases among white infants suggests that the upward trend in the crude mortality from this cause among white infants of this age period may be associated with nonresident deaths from these diseases. (Charts 17-19. See also table 13, p. 87.)

#### Changes in resident neonatal mortality rates, 1930-32 and 1934.

It is especially significant that the neonatal mortality rates among the infants of resident mothers increased in 1934 as compared with 1930-32,

Chart 16.—Crude Mortality and Mortality Among Infants Born to Resident Mothers in Certain Periods of the First Year of Life, by Color; Memphis, Tenn., 1934



Source: Crude rates, U. S. Bureau of the Census; resident rates, Memphis Department of Health.

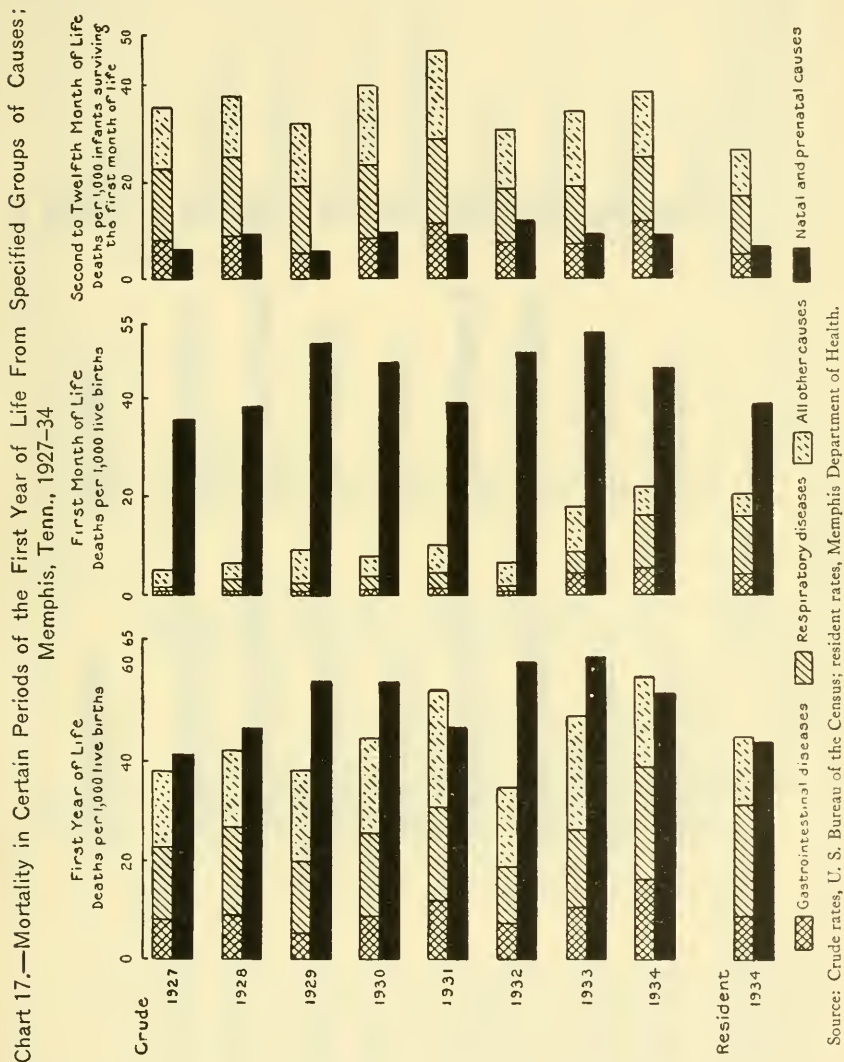
as did the crude neonatal mortality rates. (Chart 20. See also table 16, p. 89.)

Although actual mortality rates among infants of resident mothers are available only for 1930-32 and 1934, data are available for analyzing separately the effect of (1) the deaths of infants not born in Memphis on the crude rates for the years 1930 to 1934, inclusive, and (2) varying proportions of births to nonresident mothers in Memphis and the early deaths of such infants for the years 1927 to 1934.



**Influence of deaths in Memphis of infants not born there on crude infant mortality rates.**

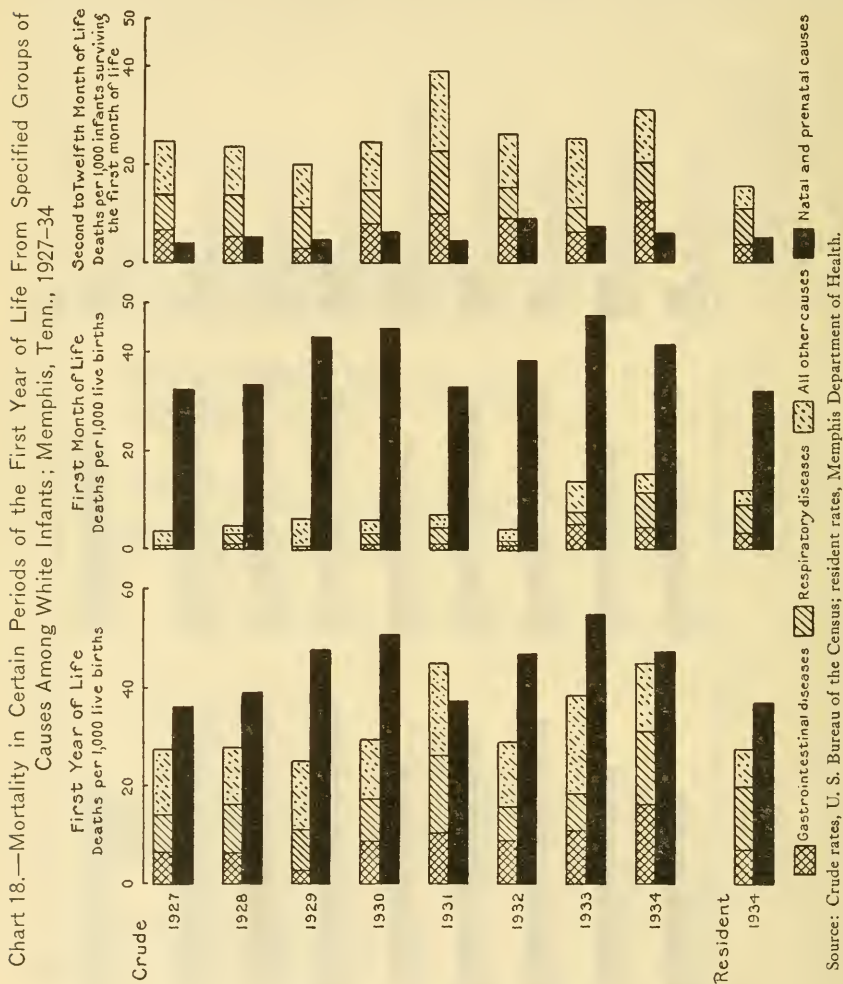
*Deaths of infants not born in Memphis in relation to the total number of infant deaths.*—Infant deaths in the first month of life in Memphis are largely those of infants born in the city. Deaths of infants born else-



where form a small and practically negligible proportion of deaths during this period. Since 1930 from 95 to 98 percent of the neonatal deaths (92 to 96 percent of the white and 98 to 100 percent of the colored) have been of infants born in Memphis.

For the second to twelfth month period, however, the situation is quite different. Deaths of infants not born in Memphis have formed a steadily

increasing proportion of deaths occurring in the city. Of the deaths in the second to the twelfth month they formed 12 percent in 1930, 37 percent in 1934; of the deaths of white infants, 29 percent in 1930, 53 percent



in 1934; of the deaths of colored infants, 1 percent in 1930, 21 percent in 1934. (Chart 21. See also table 17, p. 90.)

*Effect of deaths of infants not born in Memphis on crude infant mortality rates.*—The influence of deaths of infants not born in Memphis on the infant mortality rates since 1930 is shown in chart 22. This shows clearly that the infant mortality, particularly among white infants, has been raised appreciably from 1931 on by deaths in the city of infants not born there. It also shows that the rise in infant mortality among both white and colored in 1933 and 1934 as compared with 1932 is asso-

Chart 19.—Mortality in Certain Periods of the First Year of Life From Specified Groups of Causes Among Colored Infants; Memphis, Tenn., 1927-34

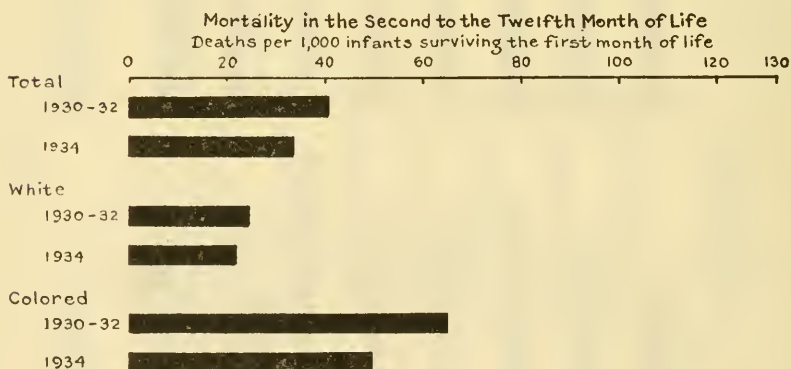
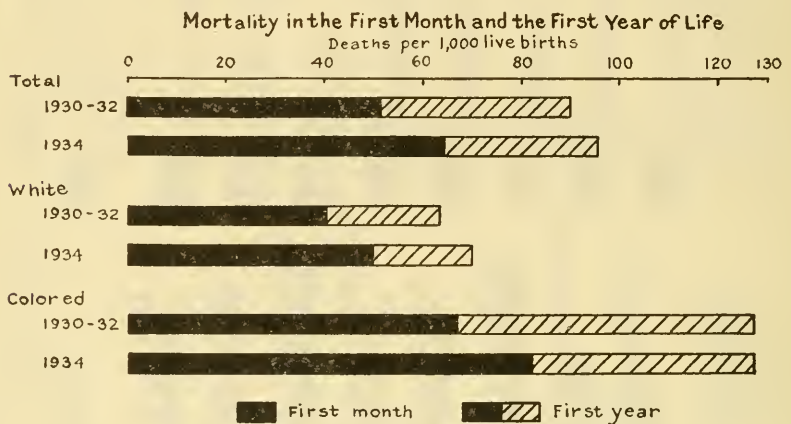


Source: Crude rates, U. S. Bureau of the Census; resident rates, Memphis Department of Health.

ciated with an increase in mortality among infants born in the city. (See also table 18, p. 91.)

The deaths of infants not born in Memphis have obviously had no significant influence on the neonatal mortality rates. In the second to twelfth month mortality, however, they have exercised a large influence

Chart 20.—Mortality in Certain Periods of the First Year of Life Among White and Colored Infants of Resident Mothers; Memphis, Tenn., 1930-32 and 1934



Source: Memphis Department of Health.

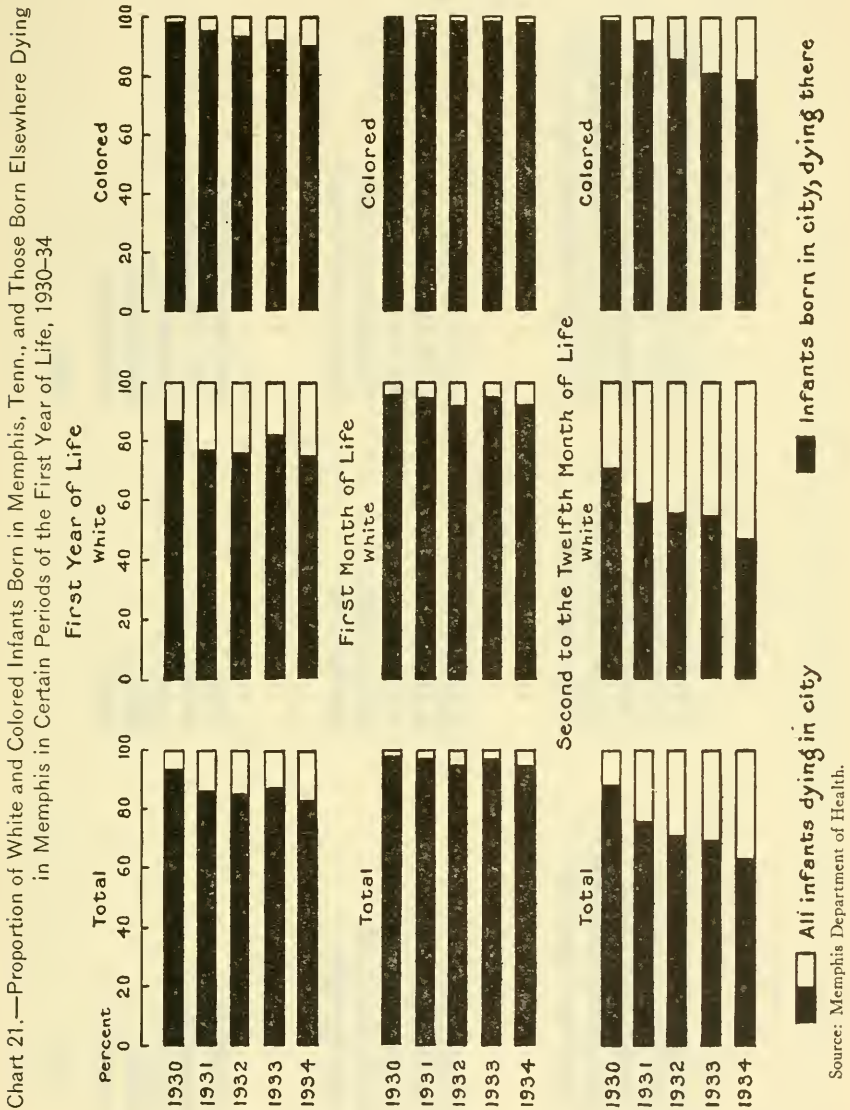
on the rates for white infants and an apparently increasing influence in recent years on the rates for colored infants.

*Comparison of mortality among infants born in Memphis with crude infant mortality in three Southern cities, 1930-34.*—Comparison of the mortality among infants born in Memphis with crude infant mortality in three Southern cities from 1930 to 1934 (chart 23) reveals that the mortality among infants born in Memphis has been considerably higher than the crude mortality among all infants in the three cities in every year of the period. This is true also for the mortality among colored infants, and the difference has become greater recently. However, the mortality



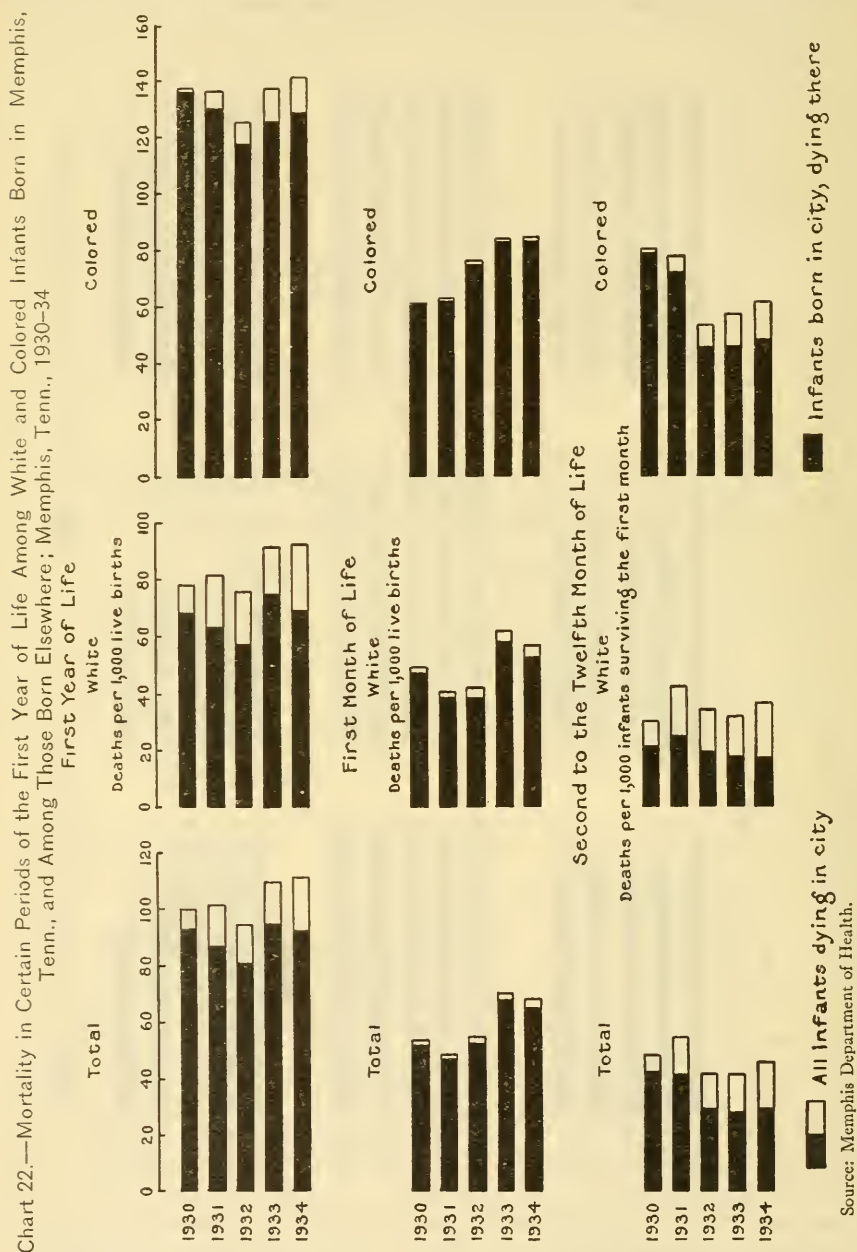
among white infants born in Memphis has been only slightly higher, except in 1933, than the crude rate for the three cities.

The great difference in neonatal mortality between Memphis and the three cities in 1933 and 1934 is not appreciably lessened by the elimina-



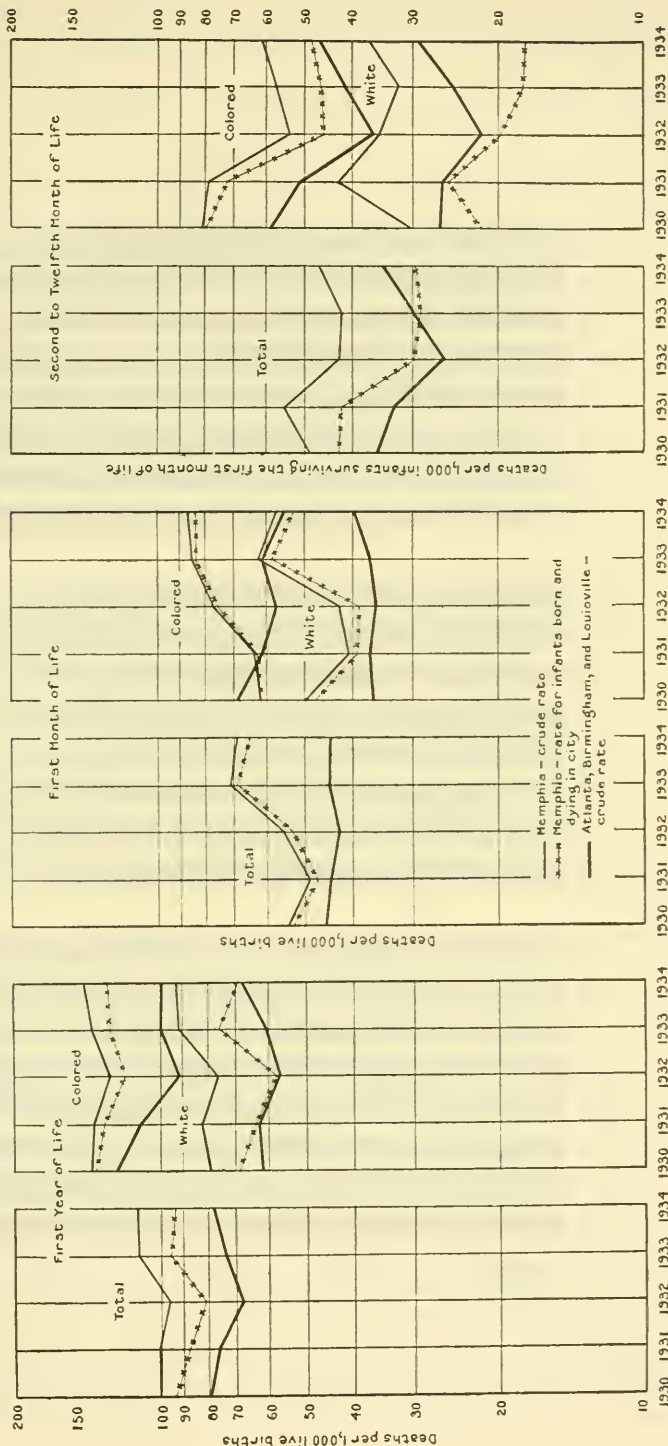
tion of mortality among infants not born in Memphis, either for the total or among white and colored separately. For the second to the twelfth month, however, mortality among infants born in Memphis was slightly lower than in the three cities in 1933 and 1934. For the second to twelfth month period the Memphis rate for white infants born in Memphis has

been lower than the crude rate for the three cities throughout the period 1930-34, and in 1933 and 1934 very markedly lower. In 1933 and 1934



the second to twelfth month mortality of colored infants born in Memphis was very close to the crude rate for the three cities, although in previous years it had been much higher. These comparisons suggest that part of

Chart 23.—Mortality Among White and Colored Infants Born in Memphis, Tenn., and Dying in the City in Certain Periods of the First Year of Life Compared With Crude Mortality in Memphis and in Three Southern Cities, 1930-34

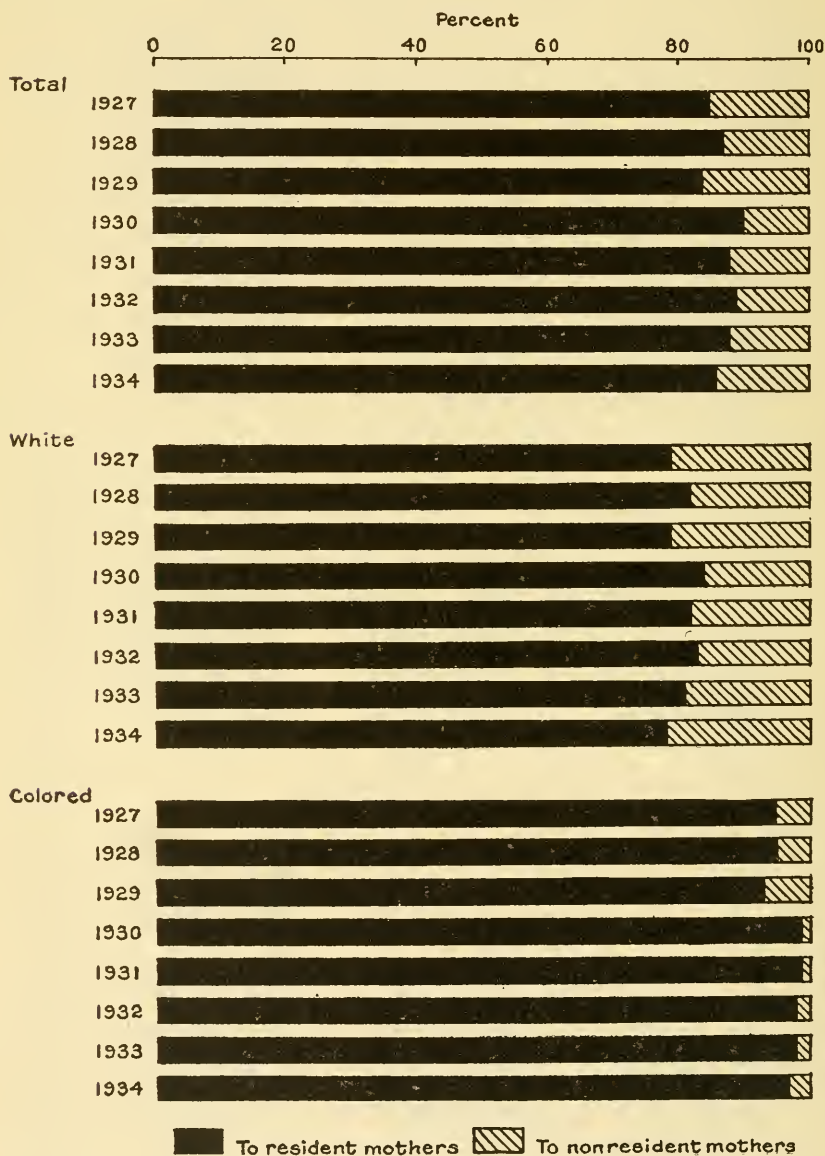


Source: Memphis resident rates, Memphis Department of Health; all others, U. S. Bureau of the Census.



the very marked difference between the infant mortality of Memphis in the second to the twelfth month, particularly among the white infants,

Chart 24.—Proportion of Live Births, by Color, to Resident and to Nonresident Mothers; Memphis, Tenn., 1927-34



Source: Memphis Department of Health.

and the three Southern cities with which it has been compared may be the effect of the very large proportion of deaths of infants not born in Memphis. (This suggestion is based on the premise that the rates from

the second to the twelfth month in the other cities are not so markedly influenced by nonresident deaths as in Memphis—a premise that merits investigation.<sup>3</sup>)

*Deaths in Memphis of infants not born in the city during the years 1930 to 1934 had practically no influence on the high and rising mortality rates in the first month of life. They were, however, responsible for more than one-fourth of the mortality of white infants in the second to the twelfth month in 1930 and for slightly more than one-half of this mortality in 1934; for practically none of the mortality of colored infants in the second to the twelfth month in 1930 and for approximately one-fifth of this mortality in 1934.*

**Extent to which neonatal mortality rates were influenced by births to nonresident mothers in Memphis and deaths in Memphis of infants born there of nonresident mothers.**

Births in Memphis to nonresident white mothers have made up from 16 to 22 percent of the total white live births in the city since 1927. (Chart 24. See also table 19, p. 91.) Even if the neonatal mortality among infants born in Memphis of nonresident mothers were sufficiently higher than among infants of resident mothers to raise the total neonatal mortality significantly (and available evidence indicates that it is not), the relatively slight changes in the proportions of such births from year to year would eliminate them as a significant factor in the rising neonatal mortality rates among white infants.

Births in Memphis to nonresident colored mothers are so few that they are obviously insignificant as a factor in the high and rising neonatal mortality among colored infants. Since 1927 they have made up from 1 to 7 percent of the total live births; since 1930, only 1 to 3 percent.

*Births in Memphis to nonresident mothers and the deaths of their infants do not account for the high and rising neonatal mortality among both colored and white infants.*

### **Trend of Births in Hospitals in Relation to Infant Mortality in Memphis**

The percentage of births (live births and stillbirths) occurring in hospitals in Memphis between 1927 and 1934 (see table 20, p. 92) has increased for the white from 66 percent in 1927 to 79 percent in 1934 and

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<sup>3</sup> In order, if possible, to clarify this point letters were written to the health officers of Louisville, Birmingham, and Atlanta, requesting details such as were obtained from Memphis as to births and deaths of infants in these cities in accordance with the mother's residence. Birmingham was the only city which was able to furnish this information. Comparison of the Birmingham and Memphis data reveals that since 1931, and especially in 1934, the Memphis second to twelfth month rate has been influenced to a greater degree by the deaths of infants of nonresident mothers than that of Birmingham, although the deaths among white infants of nonresident mothers appreciably affected the rates of both cities. (For Birmingham figures see tables 40 and 41, pp. 102-103.)

has averaged 40 percent for the colored. The rising neonatal mortality rate among colored infants cannot therefore be said to be associated with an increasing proportion of hospital births. With the information available it is not possible to say whether the increase in the neonatal rate among white infants is associated with increased hospitalization.

### **Maternal and Child-Health Program in Relation to Infant Mortality in Memphis**

#### **Development and adequacy of maternal and child-health program, 1921-29.**

Although in 1927 to 1929 infant mortality in Memphis was relatively high, it had declined in 1926 and 1927 from much higher levels. This decline accompanied the development of a maternal and child-health program launched by the city department of health in 1921 under specialized medical direction. This program involved (besides the development of a free milk fund<sup>4</sup> for babies in need of it, the licensing and control of midwives, and the supervision of maternity homes and infant boarding homes) the rapid growth of a generalized public health nursing service in the health department, which devoted a large proportion of its activities to maternal and infant-health supervision, and the establishment of prenatal and infant-health clinics at the Memphis General Hospital as a cooperative undertaking of the health department, the hospital, and the University of Tennessee Medical School. In 1928 the director of maternal and child health in the health department resigned, and there has been no specialized medical supervision and direction of this work since that time.<sup>5</sup>

In 1929 a survey of health problems and facilities in Memphis by the American Public Health Association pointed out that clinical and nursing services for maternal care in Memphis, although adequately planned and on the whole effective in relation to the needs of the average community, were somewhat below the amount required by a population in which maternal and neonatal mortality and stillbirth rates were above the average; that the major deficiency of the service for infant hygiene was the lack of adequate medical clinic care; and that while the division of public-health nursing had made notable accomplishments in the past in spite of the handicap of a small staff, the imperative need for intensification of nursing in the fields of tuberculosis and child hygiene demanded an immediate program of expansion.

<sup>4</sup> The Cynthia Milk Fund, collected by one of the Memphis newspapers.

<sup>5</sup> Until the summer of 1935, when a director of maternal and child health in the Memphis Department of Health was appointed.

**The need of an expanded maternal and child-health program in relation to annexation of wards 34, 35, and 37 to 50, inclusive, in 1928 and 1929.**

These comments on the deficiencies and needs of the maternal and child-health program in Memphis are of especial significance in view of the fact that in 1928 the city annexed ward 37 and in 1929 wards 34, 35,

Chart 25.—Live Births to Resident and to Nonresident Mothers; Memphis, Tenn., 1927-34



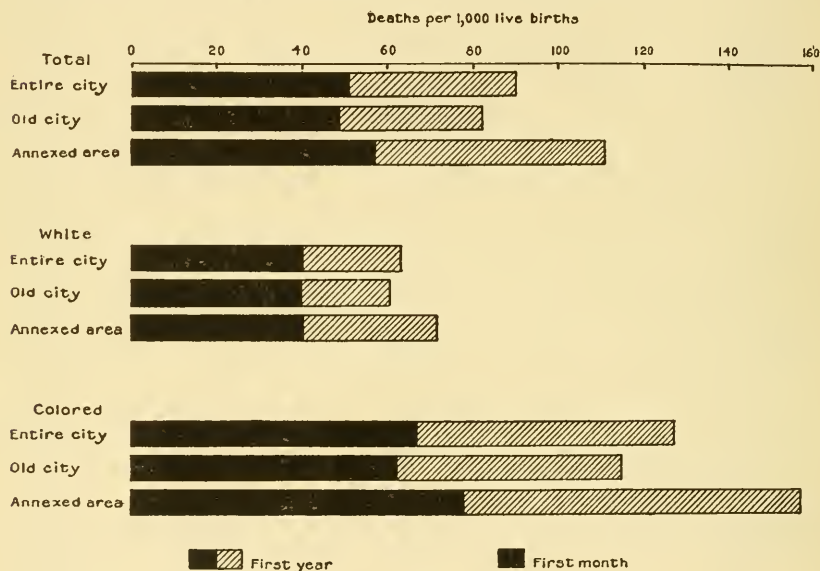
Source: Memphis Department of Health.

and 38 to 50, inclusive, increasing the population approximately 25 percent. The additional direct responsibility brought to the city by these annexations in relation to infant welfare is apparent in the increased number of resident births occurring in 1930 and the years immediately following. (Chart 25. See also table 19, p. 91.) The additional territory brought with it an even greater infant-mortality problem than existed

in the old city. This is shown in chart 26, which compares the infant mortality of the old city and the annexed territory for the years 1930-32, and even more vividly by the maps showing mortality among white and colored infants by wards for 1930-32 (charts 27 and 28).

Even after the addition of this new territory, which brought with it a higher infant mortality rate than that of the old city, Memphis did not expand its health services for mothers and babies, which the survey of 1929 had considered inadequate to the needs of the old city. Specialized

Chart 26.—Mortality in the First Month and the First Year of Life Among White and Colored Infants Born to Residents of the Entire City, the Old City, and the Area Annexed in 1928 and 1929; Memphis, Tenn., 1930-32



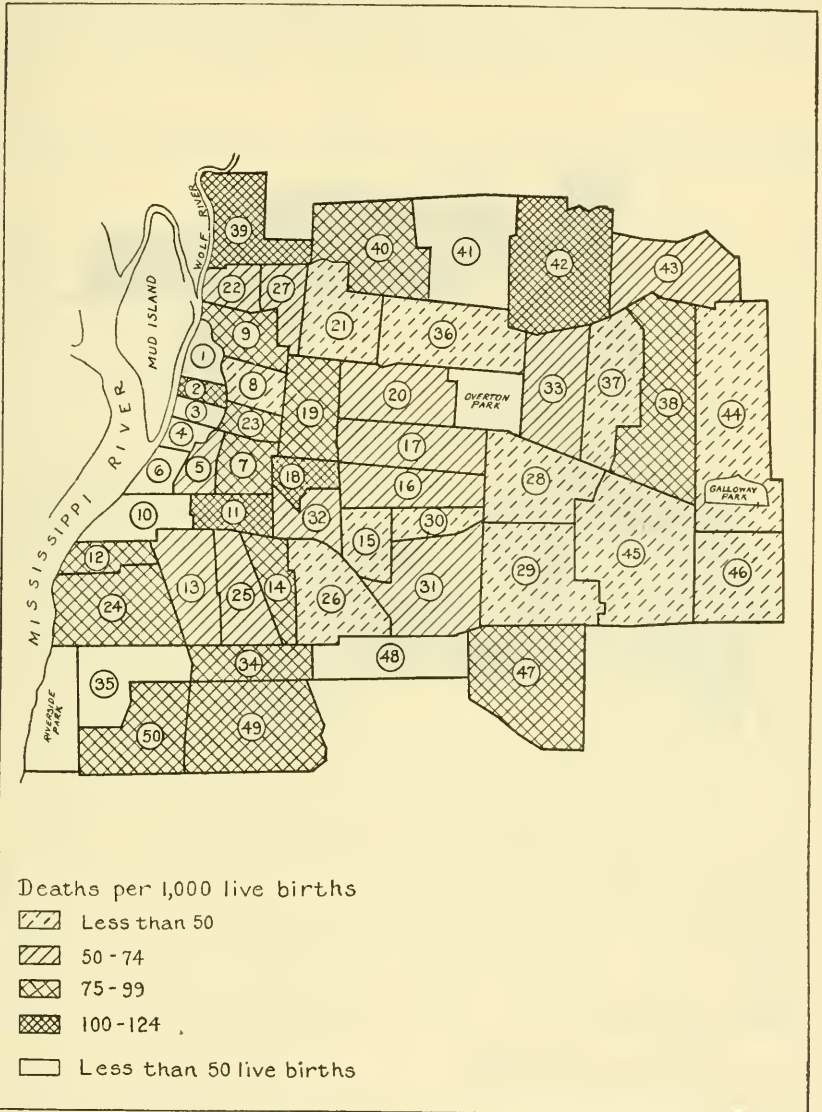
Source: Memphis Department of Health.

medical direction and supervision, which had existed from 1921 to 1928, was lacking. The 1929 survey of the American Public Health Association reported that to provide an adequate public health nursing service for the old city a minimum of 44 staff nurses in the health department was necessary, in addition to supervisors, and that, if the needs of the annexed territory were similar to those of the old city, 52 staff nurses would be the minimum required. The needs of the new territory were obviously greater than the needs of the old, yet the number of staff nurses in the division of public-health nursing of the health department, which was 34 in 1929, remained 34 in 1934.<sup>6</sup> Moreover, since 1929 the

<sup>6</sup> In 1930 the Metropolitan Life Insurance Co. set up its own nursing service. Previously its nursing work had been done by the city nurses. In 1934 the Metropolitan Nursing Service maintained 7 staff nurses. In comparison with 1929, therefore, there are in reality 41 staff nurses doing generalized nursing in the city instead of 34. The estimate of the need of a staff of 44 nurses in the city department of health for the old city and 52 for the enlarged city was, however, exclusive of nurses doing the work of the Metropolitan Life Insurance Co.

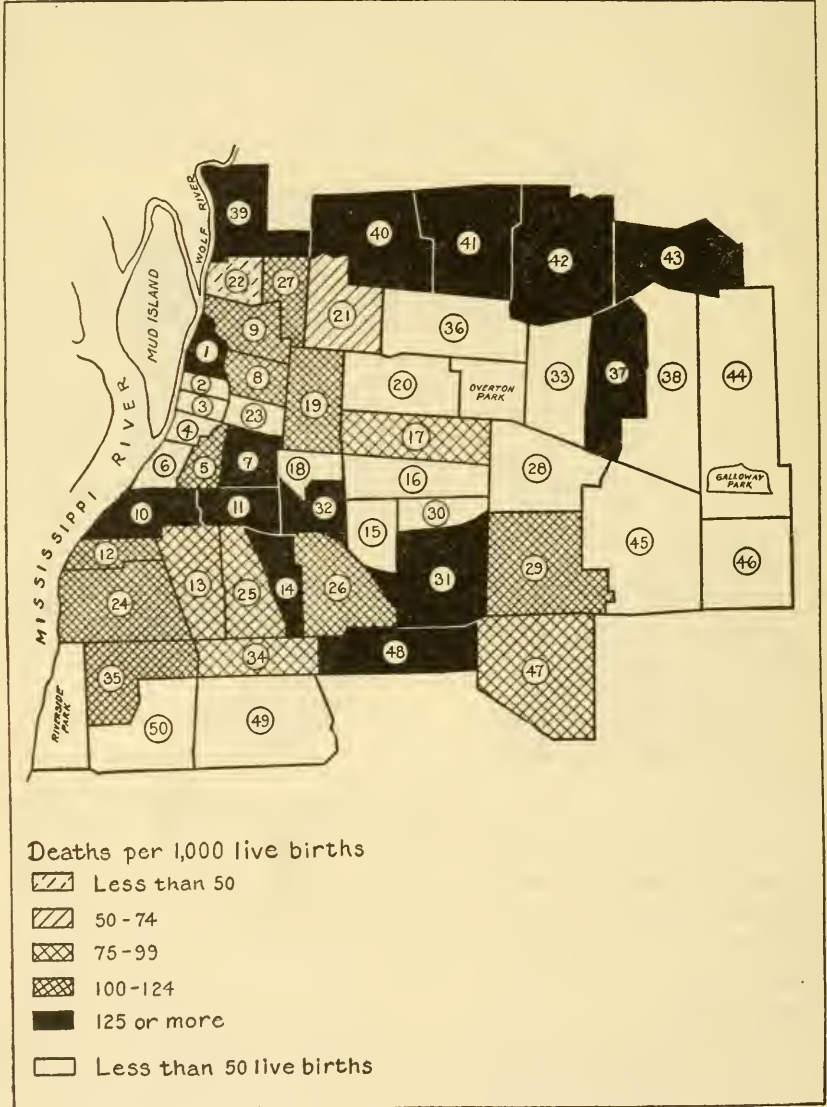


Chart 27.—Mortality Among White Infants in Each Ward of Memphis, Tenn., 1930-32



Source: Memphis Department of Health.

Chart 28.—Mortality Among Colored Infants in Each Ward of Memphis, Tenn., 1930-32



Source: Memphis Department of Health.



major and prolonged economic depression has increased the need for health services for mothers and babies in both old and new sections of the city.

There is ample evidence that both the health department, particularly the division of public-health nursing, and the Memphis General Hospital obstetric and pediatric services have carried increasing loads caused by the annexation of territory and the depression (see pp. 34, 39), but it is obvious that their efforts have not been adequate to cope with the situation.

## Economic and Social Conditions and Social Services in Relation to Infant Mortality

### Economic and social conditions.

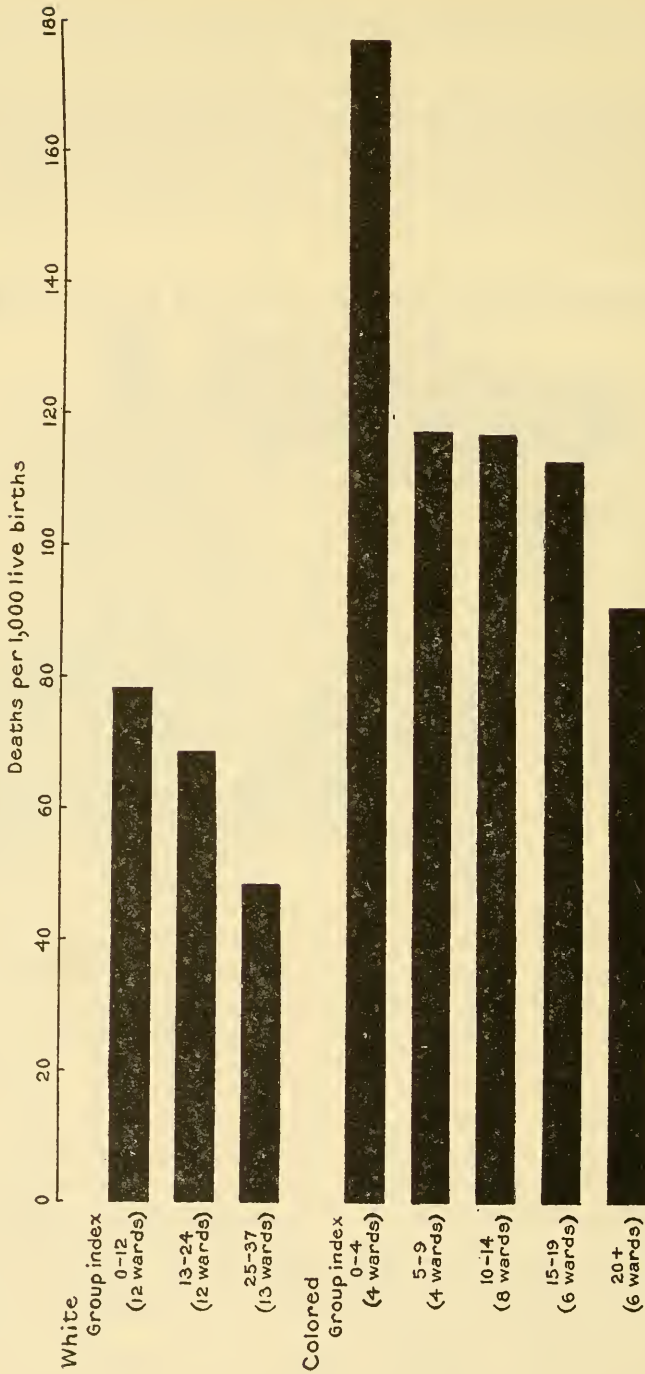
The association of high infant mortality rates with unfavorable economic and social conditions is well recognized.<sup>7</sup> That such an association occurs in Memphis has been brought out in a very interesting study recently made by the superintendent and the sanitary engineer of the Memphis Health Department of the influence of housing on residual typhoid fever and on infant mortality,<sup>8</sup> which demonstrated that wards having the lowest housing index had the highest infant mortality rate (chart 29). The indexes were based on three factors—persons per room, percentage of dwellings not in good repair, and percentage of living units with outdoor toilets; they were calculated by averaging the figures representing the numerical rank of the ward for these three factors, the poorest ward being rated 1, the next poorest 2, and so on.

Just what direct role economic conditions, particularly since 1929, may have played in the rising infant mortality rates in Memphis it is impossible to say. In 1934 only Louisville among the 16 cities of 250,000 to 350,000 population had a monthly average number of cases per 10,000 population receiving public unemployment relief that was lower than Memphis (see table 22, p. 93), so that on the surface it would appear that Memphis has been less affected by the depression than many other cities of its size. Yet the demands on the Cynthia Milk Fund, which for years has provided milk for needy babies, have become so great that milk is allotted only for short periods of time, and no more than a pint a day is allowed for any one child. Many of the babies receiving this milk are in relief families. Very little is allotted to colored babies. Because large numbers of families could not afford retail prices for cod-liver oil, money has been advanced recently for its purchase in large quantities. It has been bottled and sold at cost to patients at the well-baby clinic

<sup>7</sup> Examples are: Causal Factors in Infant Mortality, pp. 125-164 (U. S. Children's Bureau Publication No. 142, Washington, 1925) and Infant Mortality and Economic Status, Cleveland's Five-City Area, by Howard Whipple Green (Cleveland Health Council, Cleveland, Ohio, 1932; mimeographed).

<sup>8</sup> Graves, L. M., M. D., and Alfred H. Fletcher, F. A. P. H. A.: Housing Problem in a Southern City, with Special Reference to Its Influence on Residual Typhoid Fever and on Infant Mortality. *American Journal of Public Health*, vol. 25, no. 1 (January 1935), pp. 21-26.

Chart 29.—Mortality Among White and Colored Infants, by Wards, According to Varying Housing Indexes; Memphis, Tenn., 1930-32



Source: Housing Problem in a Southern City (see fn. 8, p. 37), p. 25.

of the Memphis General Hospital and occasionally is given away to those in need. The city nurses tell of many families with babies which have no ice, have had their water supply cut off, and do not even have a nursing bottle.

That the standards of living of large numbers of families in Memphis, as elsewhere, have been lowered as a result of the depression admits of little doubt. Nearly half of a small sample of 62 families studied there by the United States Children's Bureau in 1934 were living on half or less than half of their former incomes.<sup>9</sup>

#### **Social services.**

It is well recognized that neither health services for the prevention of disease nor medical services for its treatment can function efficiently if underlying basic necessities of living are lacking or inadequate. Here the social services of the community come in as important cooperating agencies with the health and medical groups, to provide supplementary relief where it is indicated and to help with constructive rehabilitation.

Social services, including relief for those in need, from public funds had never been available in Memphis and Shelby County except for mothers' aid until the fall of 1933, when Federal funds were made available for unemployment relief. Private social agencies there, as elsewhere, have had tremendous cuts in budgets—they never were adequate—so that at a time when the need for social services is greatest, when there seems every reason to believe that many families not on unemployment-relief rolls as well as those on these rolls are without some of the basic necessities of living, there has been little or no possibility for much-needed help from either public or private sources.

*The annexation of territory, bringing with it a high infant mortality rate, and the depression have increased appreciably the need for additional facilities for maternal and infant-health supervision in Memphis—facilities apparently inadequate to meet the needs of the old city in 1929. The health services have been handicapped further, especially since the depression, by the inability of many families to procure the basic necessities of living.*

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<sup>9</sup> Lenroot, Katharine F.: Children of the Depression; a study of 259 families in selected areas of 5 cities. Social Service Review, vol. 9, no. 2 (June 1935), pp. 212-242.

## *Neonatal Mortality and Associated Phenomena in Memphis*

From the discussion so far, it is apparent that the high and rising neonatal mortality which has occurred among infants of resident mothers to approximately the same extent as among all infants in Memphis presents the most outstanding problem for consideration. A closer study of neonatal mortality and related matters is therefore indicated, particularly in relation to conditions in Memphis with which it may be associated.

Two aspects of neonatal mortality in Memphis obviously call for consideration, both separately and in their relation to each other: The mortality from natal and prenatal causes, which are the predominant causes of neonatal mortality, and the mortality from other causes in the neonatal period, which, although relatively small compared with that from natal and prenatal causes, has shown an upward trend during the period 1927 to 1934, with markedly higher rates in 1933 and 1934 as compared with previous years.

### **Where Infants Were Born and Where They Died During the Neonatal Period in 1933 and 1934**

Although in Memphis 63 percent of the infants born alive in 1933 and 1934 were born in hospitals (78 percent of the white infants and 41 percent of the colored), 88 percent of the deaths of infants in the neonatal period occurred in hospitals—92 percent of the deaths of white infants and 84 percent of the deaths of colored. Thirty-seven percent of the live births occurred in homes during this period (22 percent of the white and 59 percent of the colored). Yet only 12 percent of the neonatal deaths occurred in homes (8 percent of the white infants and 16 percent of the colored). Furthermore, although only 24 percent of the births occurred at the Memphis General Hospital (14 percent of the white and 40 percent of the colored), 60 percent of the neonatal deaths occurred there—38 percent of the white and 84 percent of the colored; and although 64 percent of the births of white infants occurred at the other hospitals, 55 percent of the neonatal deaths among white infants occurred in these hospitals. (See tables 23 and 24, pp. 93-94.)

When rates are computed on the basis of live births and deaths in hospitals and homes in Memphis the neonatal mortality in the Memphis



General Hospital in 1933-34 is found to be approximately three times that of the other hospitals. (See table 25, p. 94.) The mortality in the first day and that from one day to one week are approximately twice as high in the Memphis General Hospital as in the others, but the mortality for one week to one month is more than six times as great in the Memphis General as in the other hospitals. This relation holds for the white as well as for the white and colored combined; for the colored the Memphis General is the only hospital, so that comparison with other hospitals is obviously impossible.

The rates just cited are based on crude data for the births and deaths in hospitals and homes—all the births and all the deaths. Closer study of the deaths in 1934 reveals that the deaths, especially those in the latter part of the neonatal period, in the Memphis General Hospital were not all of infants born there. Some were of infants born at home; a few were of infants born at other hospitals; some were of infants born at the Memphis General Hospital who had gone home and reentered the hospital before death. The elimination of these deaths, however, does not lower very appreciably the Memphis General Hospital rate.

Two conclusions seem justified by the above analysis: (1) That the neonatal mortality in Memphis was appreciably heightened in 1933 and 1934 by the excessive mortality at the Memphis General Hospital; (2) that it is largely the very excessive mortality from the second week to the first month occurring in the Memphis General Hospital in 1933 and 1934 that accounts for the very high Memphis mortality rate from the second week to the first month in those years.

The Memphis General Hospital is the hospital which provides free care for residents of Memphis who cannot afford private care. It provides delivery care also for nonresident as well as resident white unmarried mothers staying at the Beulah and Bethany maternity homes in Memphis, and for colored residents of Shelby County who need hospital care. The other hospitals in Memphis in general do not provide free care for residents of the city, although they do provide a certain amount of free care for white nonresident patients.

While the neonatal mortality in the other hospitals in the city is relatively high, it is apparent that the major problem in relation to the high neonatal mortality in Memphis lies with the group receiving public care.

### **Prenatal, Natal, and Postnatal Care in Memphis**

Prenatal, natal, and postnatal care for those residents of Memphis who cannot afford private care is provided cooperatively by the public health nursing division of the Memphis Department of Health, the Memphis General Hospital, and the University of Tennessee Medical School. Industrial policy holders of the Metropolitan Life Insurance Co. receive prenatal and postnatal nursing care from the Metropolitan Nursing Service.

A relatively large proportion of the activities of the staff nurses of the division of public-health nursing is devoted to prenatal home visits. Weekly prenatal clinics are conducted at the Memphis General Hospital—one for white and two for colored patients. The medical service for these clinics is provided by the obstetric staff of the Memphis General Hospital and the University of Tennessee Medical School. The nursing service for the clinics is provided by the public health nursing division of the health department. The Memphis General Hospital obstetric service maintains an in-patient hospital service for the delivery of all primiparae and of multiparae with any actual or potential complications, and a home-delivery service for the delivery of multiparae with no apparent complications. Home deliveries are conducted by the University of Tennessee medical students with the assistance of two experienced health-department nurses who attend all home deliveries. These two nurses in their spare time assist at the prenatal clinics, and the nurse in charge of the prenatal clinic relieves each of the delivery nurses one-half day a week. In addition, seven of the district nurses carrying the lightest case load and working fairly close to the hospital assist at the clinics. Postpartum care for mothers delivered at home and postnatal care for the babies are given by the district nurses of the public health nursing division of the health department.

**Number of births cared for by the Memphis General Hospital obstetric service, 1930-34.**

Five hundred and five more live births—223 more white and 282 more colored—resulted from deliveries by the Memphis General Hospital obstetric service in 1934 than in 1930. Two hundred and one of these were hospital deliveries—77 white and 124 colored; 304 were home deliveries—146 white and 158 colored. The increased burden of this service is shown by the fact that its proportion of the city's live births increased from 33 percent in 1930 to 45 percent in 1934—from 12 percent of the births of white infants in 1930 to 21 percent in 1934 and from 69 percent of the births of colored infants in 1930 to 83 percent in 1934. The proportion of live births that occurred in the Memphis General Hospital increased from 18 to 23 percent—for the white, from 9 to 13 percent and for the colored, from 33 to 39 percent. The proportion of live births resulting from deliveries in the home by the hospital obstetric service increased from 15 to 22 percent—for the white, from 3 to 8 percent, and for the colored, from 36 to 44 percent. (See table 26, p. 95.)

**Prenatal care given to patients delivered by the Memphis General Hospital obstetric service.**

The proportion of women delivered by the Memphis General Hospital obstetric service who received prenatal care increased slightly between 1930 and 1934 in spite of the increased number cared for by the service—for the total, from 88 to 90 percent; for the white, from 76 to 84 percent;

and for the colored, from 91 to 93 percent. (See table 27, p. 95.) The proportion of women delivered in the hospital receiving prenatal care increased from 78 to 82 percent—from 67 to 75 percent for the white and from 83 to 85 percent for the colored.

It is of interest that during the years 1932 to 1934 between 16 and 18 percent of the white mothers having live-born infants and 75 to 79 percent of the colored mothers in Memphis received some prenatal supervision at the Memphis General Hospital. (See table 28, p. 96.)

Moreover, there has been a tendency toward earlier registration at the prenatal clinic. Analysis for the first 4 months of 1934 of the month of pregnancy at which patients first attended the prenatal clinic shows that 81 percent had registered before the seventh month of pregnancy—72 percent of the white and 84 percent of the colored. These figures compare with 53 and 58 percent registration of white and colored respectively before the seventh month in 1929 and 29 percent registration of the white and 34 percent of the colored before the seventh month in 1926.<sup>10</sup> It is significant, as indicating increased public appreciation of the importance of early prenatal care and probably the result of educational work by the public-health nurses, that 39 percent of the white and 48 percent of the colored patients had registered even before the fifth month in the first 4 months of 1934, as compared with 25 and 20 percent for white and colored respectively in 1929.<sup>11</sup> (Chart 30. See also table 29, p. 96.) It is significant too that the average number of visits per patient to the prenatal clinic has shown a slight but steady increase—from 2.6 in 1929 and 1930 to 3.2 in 1934. (See table 30, p. 97.) The marked increase in the volume of work undertaken by the clinic is evident in the increase of 86 percent in the number of visits to it in 1934 over 1929.

#### **Prenatal home-nursing visits by health-department public-health nurses.**

The number of prenatal home visits made by the public-health nurses of the health department has also increased markedly since 1929—from 9,266 in 1929 to 13,878 in 1934, or nearly 50 percent. In addition, between 9 and 10 thousand additional prenatal home visits were made annually in 1932, 1933, and 1934 by nurses on work-relief projects who were assigned to the health department. The supervisor of the public health nursing division in the health department stated that these visits were of value chiefly as a check-up on prenatal-clinic attendance.

In 1934, as might be expected, the average number per patient of prenatal home-nursing visits by regular health-department nurses decreased from the 1929 figures both for white and colored combined and for the colored. For the white there was a slight increase. In 1929 the average number of visits to both white and colored patients was 4.4, to

<sup>10</sup> Survey of Health Problems and Facilities in Memphis and Shelby County Tenn., for the Year 1929, made for the committee on administrative practice of the American Public Health Association by W. F. Walker, Dr. P. H., secretary, and Dorothy F. Holland, Ph. D., p. 56.

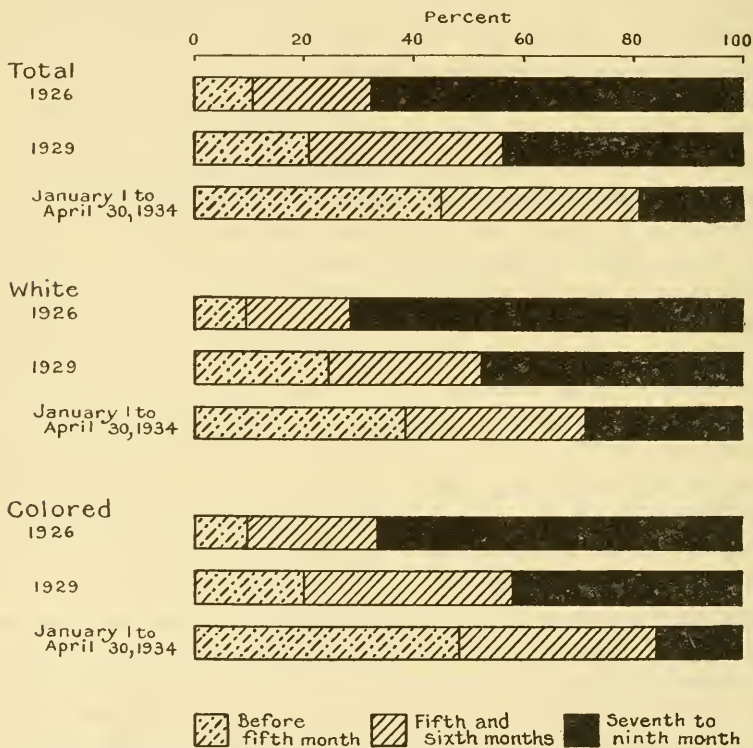
<sup>11</sup> *Ibid.*, p. 57.



white patients 3.3, and to colored patients 4.9. In 1934 the average number of visits to both white and colored maternity patients was 4.0; to white patients, 3.8; and to colored patients, 4.1.

Thus the total volume of prenatal care, both in the clinic and in prenatal home-nursing visits, has greatly increased. The care received by

Chart 30.—Proportion of White and of Colored Women First Attending Prenatal Clinic of Memphis General Hospital in Specified Periods of Pregnancy; Memphis, Tenn., 1926, 1929, and January 1 to April 30, 1934



Source: 1926 and 1929, Survey of Health Problems and Facilities in Memphis and Shelby County, Tenn. (see fn. 10, p. 43); Jan. 1-Apr. 30, 1934, Memphis General Hospital.

individual patients in terms of the average number of visits to the clinic and of the average number of home visits by the regular nurses of the health department has shown some improvement in the former and a slight falling off in the latter.

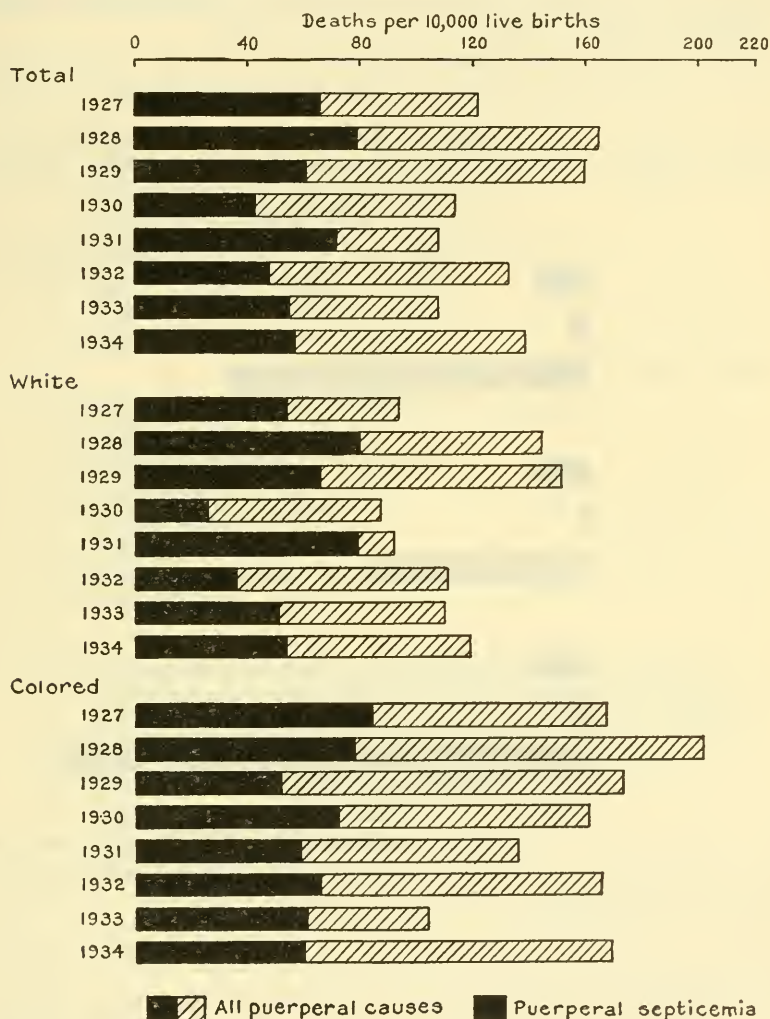
### Results of Prenatal Care

The effects of prenatal care, which implies in the largest sense adequate provision for delivery care, are looked for in reduced maternal mortality, stillbirth mortality, and mortality of live-born infants from natal and prenatal causes. Usually natal and prenatal causes affect especially the neonatal death rate.

**Maternal mortality.**

Maternal mortality in Memphis among both white and colored is very high and has shown marked variability from year to year since 1927. (Chart 31. See also table 31, p. 97.) The slight decrease shown in the

Chart 31.—Mortality From Puerperal Causes Among Mothers of White and of Colored Infants; Memphis, Tenn., 1927-34



Source: U. S. Bureau of the Census.

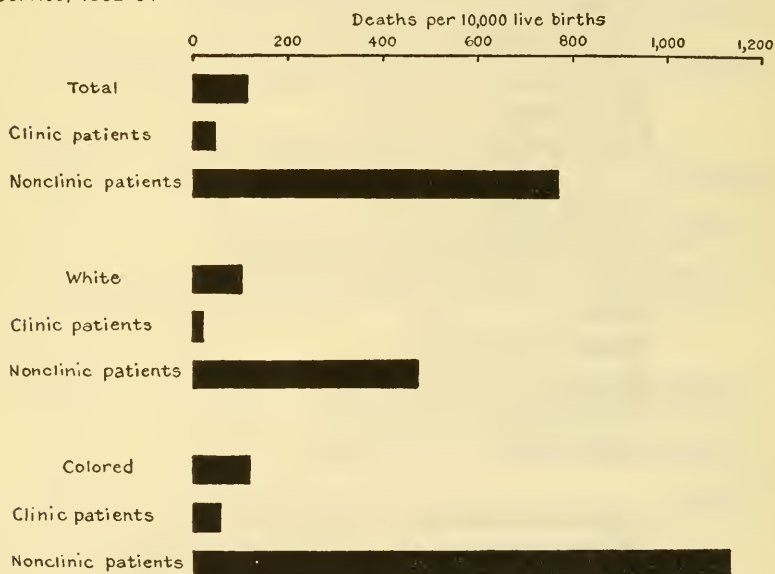
rates when the periods 1927-30 and 1931-34 are compared is not sufficient to be statistically significant. (See table 32, p. 97.) It is also of interest that maternal mortality for the period 1931-34 among both white and colored women in Memphis exceeded that of Atlanta, Birmingham, and Louisville. (See table 35, p. 99.)

Material is not available for analyzing maternal mortality in Memphis in detail. However, from the annual reports of the Memphis General Hospital obstetric service it has been possible to compute the mortality from puerperal causes among patients cared for by this service and the mortality among patients receiving prenatal-clinic care and among those not receiving such care.

**Maternal mortality among patients cared for by the Memphis General Hospital obstetric service.**

Mortality assigned to puerperal causes per 10,000 live births among patients cared for by the Memphis General Hospital obstetric service is

Chart 32.—Mortality from Puerperal Causes Among Clinic Patients and Among Nonclinic Patients, White and Colored; Memphis General Hospital Obstetric Service, 1932-34



Source: Annual reports, Memphis General Hospital obstetric service.

high. But the relatively low mortality among women who received care at the prenatal clinic, as compared with the mortality among all patients cared for by the service and the greatly excessive mortality among non-clinic patients, is noteworthy. (Chart 32. See also table 36, p. 99.) The nonclinic patients of course include emergency cases and cases of very early termination of pregnancy, which for the most part do not occur in the clinic cases. In view of the fact that from 1932 to 1934 live births to colored clinic patients formed 75 to 79 percent of the colored live births in the city, the relatively low maternal mortality among these patients is an indication of a retarding role played by the service on colored maternal mortality in the city.

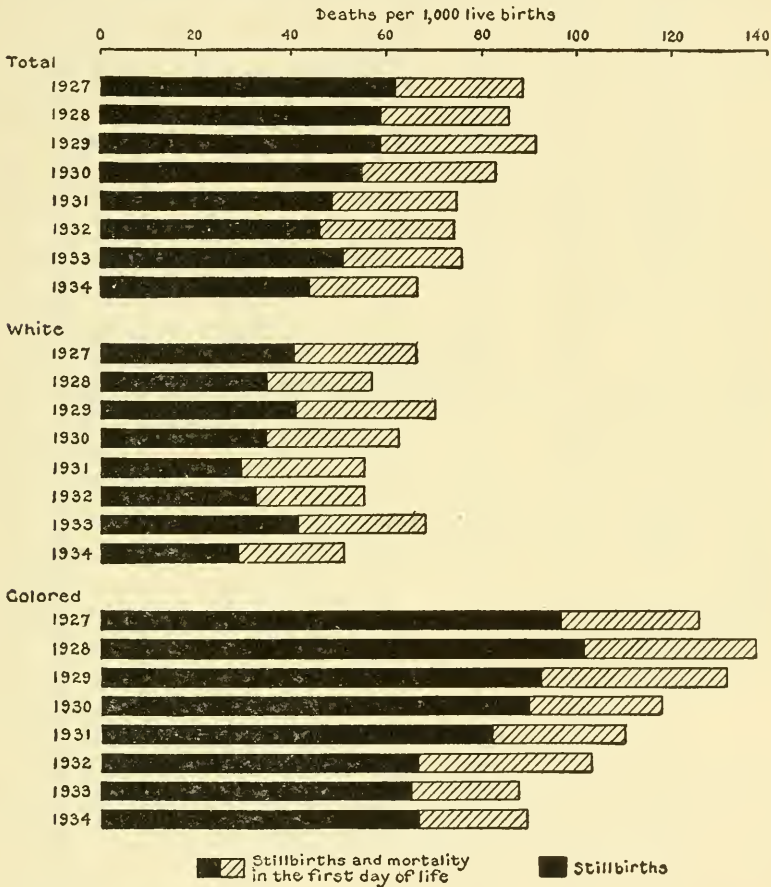
The almost unbelievably high maternal mortality rates among the nonclinic patients of the Memphis General Hospital obstetric service—practically all of whom were admitted to the hospital in emergency—

indicate the importance of bringing this group of patients, small as it is, under good prenatal and natal care.

**Mortality from stillbirths and of infants in the first day of life.**

There has been a definite downward trend in stillbirth mortality among the colored. Although there has been much variability from year to year

Chart 33.—Stillbirths and Mortality in the First Day of Life Among White and Colored Infants; Memphis, Tenn., 1927-34

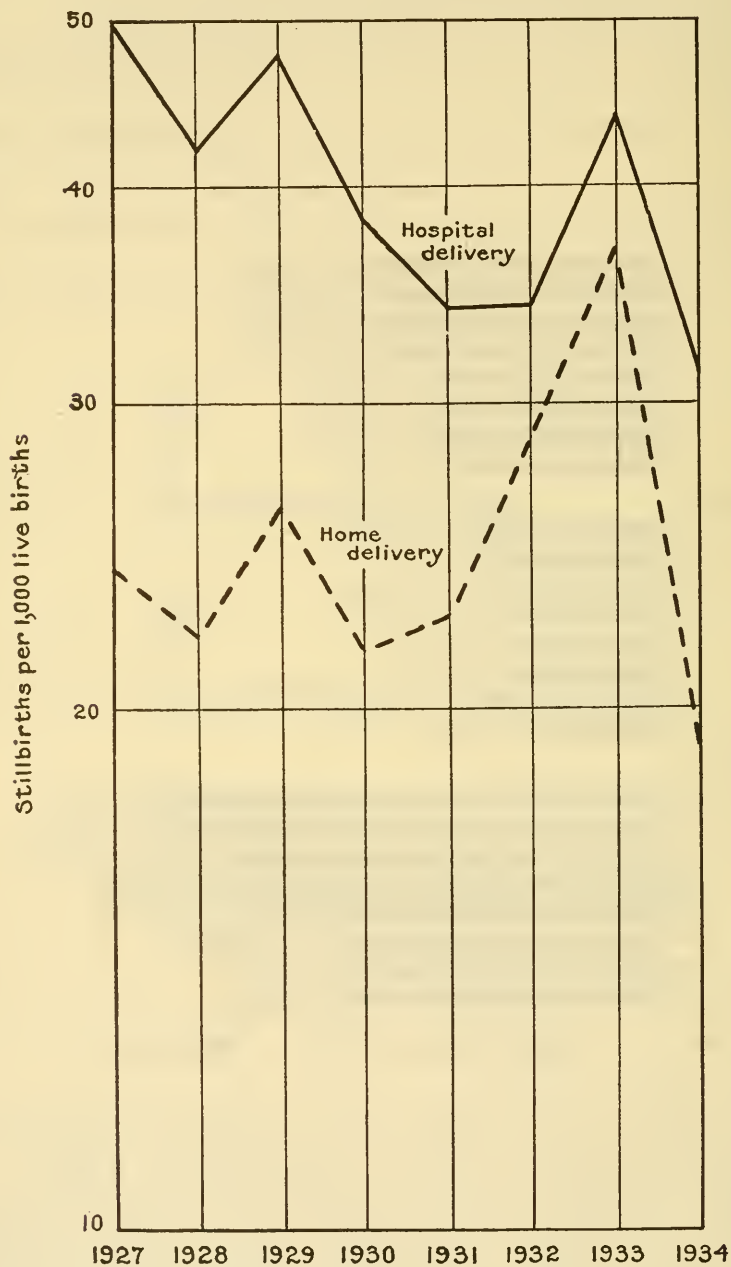


Source: U. S. Bureau of the Census.

in the stillbirth mortality among the white, the 1934 rate is significantly lower than the 1927 rate. (Chart 33. See also table 37, p. 100.)

When one analyzes the trend of stillbirth mortality in hospitals and homes, it is apparent that the white stillbirth mortality in hospitals, although greatly in excess of the stillbirth mortality in homes, has shown a downward trend in the period 1927-34, except for a marked increase in 1933. The white stillbirth mortality in homes has not, however, shown a downward tendency during this period. What decline there has been,

Chart 34.—Mortality Rate from Stillbirths to White Women Delivered in Hospitals and at Home; Memphis, Tenn., 1927-34



Source: Compiled from figures supplied by the Memphis Department of Health.



therefore, in white stillbirth mortality results from the downward trend for hospitals. (Chart 34. See also table 38, p. 100.) It is of interest that the white stillbirth mortality in the Memphis General Hospital is not significantly different from that in the other hospitals.

Among the colored, although hospital stillbirth mortality has been lower from 1929 to 1934 than in 1927 to 1928, the decline in the home stillbirth mortality has been much more marked. The very great height of the home stillbirth mortality among cases cared for by colored physicians is apparent—it was higher than the hospital mortality in every year except 1932 and 1933—as is the effect of this mortality in raising the total home stillbirth mortality among the colored. The striking decline in home stillbirth mortality among the colored patients cared for by white physicians is especially significant in view of the fact that all but an insignificant number of the births to colored women delivered at home by white physicians are attended by medical students on the home-delivery service of the Memphis General Hospital, assisted by health-department nurses (chart 35). All the patients cared for on the home-delivery service of the Memphis General Hospital have had prenatal care at the clinic.<sup>12</sup>

Because many of the deaths of infants in the first day of life are very closely allied in cause to stillbirths, it seemed worth while to consider together the changes in mortality from stillbirths and from deaths of infants in the first day of life. The mortality of colored infants in the first day of life has shown some variability but was lower in 1933 and 1934 than in any previous year of the period 1927-34. The rate for white infants also fluctuates, but there appears to have been a slight downward trend since 1929. (Chart 33. See also table 37, p. 100.) When mortality from stillbirths and deaths in the first day are considered together, most of the variability is ironed out among the colored, and there appears a definite downward trend. The mortality among the white is characterized chiefly by variability (chart 33).

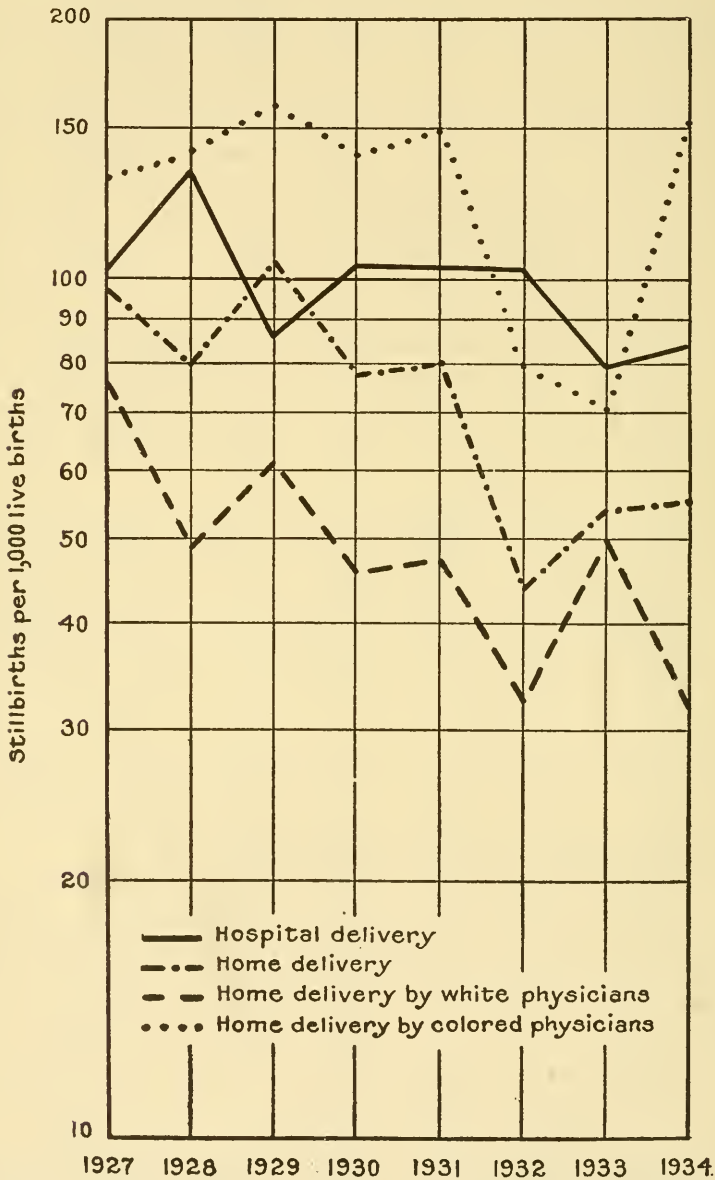
The striking downward trend in the combined mortality from stillbirths and deaths in the first day among the colored may be considered evidence of significant accomplishment on the part of the public health nursing division of the health department and the Memphis General Hospital obstetric service. This service delivered 69 percent of the colored live births in the city in 1930 and 83 percent in 1934; it had more than 90 percent of the colored patients delivered under prenatal-clinic care. (See tables 26 and 27, p. 95.)

It is not possible to compare the stillbirth mortality among women receiving prenatal care from the Memphis General Hospital obstetric

<sup>12</sup> The home stillbirth mortality among patients delivered by colored physicians is obviously not strictly comparable with that among patients delivered by white physicians, as the latter are for the most part uncomplicated cases cared for by the Memphis General Hospital obstetric service.



Chart 35.—Mortality Rate From Stillbirths to Colored Women Delivered in Hospitals and to Those Delivered at Home by White Physicians and by Colored Physicians; Memphis, Tenn., 1927-34<sup>1</sup>

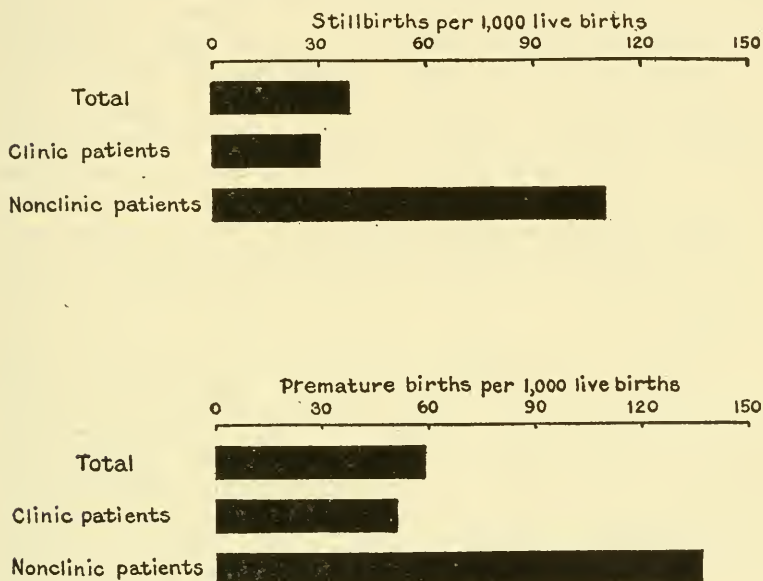


<sup>1</sup> The stillbirth rates among women delivered by midwives are excluded because the number of live births to such women was less than 100 in each year from 1931 to 1934.

Source: Memphis Department of Health.

service with that among women in the city as a whole, who may or may not have had prenatal care, because the obstetric service in its annual reports considered as stillbirths fetuses of 7 or more months' gestation; whereas the health department enumerates as stillbirths, under the State law, all dead-born fetuses of 5 or more months' gestation. Figures obtained from the obstetric-service reports, however, show nearly four times the incidence of stillbirth mortality (according to the definition used by the service) among women delivered by the obstetric service who did not attend the prenatal clinic as among those delivered by the

Chart 36.—Stillbirth Rate and Incidence of Premature Births Among Clinic Patients and Among Nonclinic Patients; Memphis General Hospital Obstetric Service, 1932-34



Source: Annual reports, Memphis General Hospital obstetric service.

obstetric service who did attend the clinic. (Chart 36. See also table 36, p. 99.)

Many early infant deaths are caused by prematurity, which is often closely related in cause to stillbirths. The higher incidence of premature births among women delivered by the Memphis General Hospital obstetric service not receiving prenatal care as compared with those receiving prenatal care is also shown in chart 36 and table 36 (p. 99).

### Possible Reasons for High and Apparently Rising Mortality From Natal and Prenatal Causes

In spite of the slightly downward trend in mortality among infants in the first day of life, practically all of which is due to natal and prenatal causes, these causes have shown a slight upward tendency as a cause of

mortality in the first month of life, which suggests that proportionately more infants surviving the first day have been dying from natal and prenatal conditions.

Obviously, possible reasons for the rise in mortality from natal and prenatal causes merit careful consideration, as does the possibility of a further decline in stillbirth mortality. Deaths from natal and prenatal causes include deaths from syphilis, from prematurity, from injuries at birth, from congenital debility, and from congenital defects of various kinds.

Syphilis is a well-known cause of stillbirths and premature births. The Memphis General Hospital obstetric service reports evidence of syphilis in 39 percent of women who had miscarriages in 1931-33 and in 40 percent of those who had stillbirths and 26 percent of those who had premature deliveries during the period 1930-34. Although the deaths actually attributed to congenital syphilis on the death certificates are relatively few, it is well known that congenital syphilis is often unrecognized, and many infants who die from other causes may have congenital syphilis as an underlying debilitating and predisposing factor. That this may well be true in Memphis is indicated by the fact that in 1934, among infants of resident mothers who died, 27 percent of the cases for which there were reports as to tests for syphilis in the mother recorded its presence—13 percent among the white, 31 percent among the colored.

The Memphis General Hospital obstetric service plans to do routine tests for syphilis on all pregnant women who register at the prenatal clinic, and all positive cases are referred to the dermatological clinic for treatment. That this procedure has been one of the most potent factors in reducing the Negro stillbirth rate and the infant death rate from congenital syphilis admits of little doubt. But many women still register too late in pregnancy for beneficial effects for the child to be reasonably assured through treatments, although it is true, of course, that even a few treatments are often helpful; and though effort is made to have the tests routine, some women apparently do not get them.

The much higher stillbirth rate among colored infants delivered by colored physicians makes one wonder whether syphilis unlooked for and inadequately treated during pregnancy may not be an important factor here. (Chart 35. See also table 38, p. 100.)

Many difficulties in the way of these women getting consistent and regular treatment present themselves. The question of carfare is a vital one for many of them who are either on relief or bordering on destitution; the fact that there is only one clinic a week for them and that it is in the daytime creates difficulty for working women, many of whose families are dependent upon them for support.

The high incidence of syphilis among pregnant colored women is evidence of a high incidence among the population as a whole, and a

vigorous educational social-hygiene campaign with expansion of public facilities for treatment of syphilis would undoubtedly contribute appreciably toward lowering the stillbirth and infant mortality rates.

Stillbirths and premature deliveries are frequently associated, in addition to syphilis, with other prenatal and natal factors, such as the toxemias of pregnancy and complications during labor. Adequate prenatal care will detect a large proportion of the toxemias early, and early treatment will in many cases prevent their development into serious conditions which are hazardous to the life of both mother and baby. Prenatal study will also determine whether there is likely to be obstruction in the birth canal, make possible planning for the kind of delivery indicated, and so prevent many of the stillbirths and birth injuries which are the result of long, difficult labors due to so-called dystocia not recognized and not planned for.

Other pathological conditions, too, often extremely hazardous to both mother and child, may usually be detected early through prenatal supervision, and treatment can be planned which will reduce the hazards to a minimum.

Prenatal care is but the beginning and may represent effort wasted, in part at least, if women are subjected to unnecessary hazards during labor and if the best medical judgment is not called into play in determining procedures necessary when abnormal conditions develop. Many stillbirths and birth injuries, as well as deaths of many babies soon after birth, are the result of such abnormal conditions.

Some of the drugs, such as morphine and scopolamine, used to produce painless or partially painless labor, although apparently harmless to the mother, must be looked to as a possible cause of some stillbirths and some early deaths of newborn infants. These drugs are widely used in Memphis. The question whether they may not be too widely used should be given careful consideration. But, apart from this, careful observation and prompt treatment, by modern methods of artificial respiration, of the newborn infant whose breathing is feeble, occasionally of the apparently stillborn, has been demonstrated to prevent a certain number of deaths of the newborn and to counteract the effect on the infant of narcosis of the mother.

The reduction of prematurity through the treatment of prenatal syphilis and the early detection and treatment of the toxemias and other conditions have been discussed. It is significant that the Memphis General Hospital records indicate that the incidence of premature births was more than twice as high among those who had not registered for prenatal care as among those who had. (Chart 36. See also table 36, p. 99.) In all communities, however, the number of premature births from unknown causes continues high, and deaths of infants from prematurity form the highest percentage of deaths in the neonatal period. On the other hand, modern methods for the care of the premature have demonstrated that many of them can be saved.

The failure of the death rate from natal and prenatal causes to decline, in spite of other evidences of the beneficial effects of the public prenatal care that has developed in Memphis, gives interest to speculation whether this failure may not be accounted for in part by an association between low vitality in the newborn and undernutrition in the mother. There are no concrete data for Memphis to prove or disprove this association, but according to the supervisory nurses at the Memphis General Hospital many of the women coming to the hospital for delivery in recent years were in wretched general condition and obviously hungry.

The results of both prenatal and natal care received by patients under the health department and the Memphis General Hospital obstetric service, as shown by the mortality among those receiving this care and as reflected in the city's stillbirth mortality and the mortality among infants in the first day of life, particularly the colored, have already been discussed. The very high mortality among patients delivered at the Memphis General Hospital who did not have prenatal-clinic care and who for the most part were brought in as emergency cases, the high incidence of stillbirths and premature births among this group, and the high incidence of stillbirths among colored infants delivered by colored physicians are indications of the need for further education of the public and of the medical profession.

The colored physicians are keenly aware of their need of continuous education in prenatal, natal, and infant care. At a meeting which a group of them requested the writer to attend, they expressed concern over their lack of opportunity for postgraduate clinical training. It is of significance that a communication of this desire for instruction to the dean of the Medical School of the University of Tennessee has resulted in a plan to arrange for clinics for colored physicians in maternal and infant care.

Many of the patients admitted to the Memphis General Hospital as emergency cases are of the group whose only opportunity for care lies through public provision. They will have to be reached and educated by the public-health nurses and persuaded to go to the clinic for prenatal medical supervision. This means an increased public health nursing staff and more prenatal-clinic facilities. For it must be pointed out that although there has apparently been some improvement in the quality and an increase in the quantity of prenatal care, this has been accomplished almost entirely by an increased case load on the part of the nurses and the clinic which appears to have overreached their capacities.

Undoubtedly more maternal and infant lives among the present group of patients could be saved if the nurses had more time for educational work, both at home and at the clinic, and for necessary follow-up of clinic cases and if there were opportunity at the clinic for more careful medical supervision. Such supervision is important for all patients for the early detection and prompt treatment of the toxemias of pregnancy, and espe-



cially important for those patients receiving antisyphilitic treatment. Undoubtedly, too, although only cases apparently free from complications are chosen for the home-delivery service, there would be much better results in this service if there were direct medical supervision of the medical students conducting deliveries, and if patients having complications such as postpartum hemorrhages received at least emergency treatment in the home whenever possible before being subjected to the additional shock of transfer to the hospital when such transfer is indicated. This supervision should include the care of the newborn baby in the home. Apart from other considerations, sound policy dictates the need for such direct medical supervision.

With regard to the possibility that more adequate provision for artificial resuscitation of the newborn and for the care of the premature might reduce the death rate from natal and prenatal causes, it was the impression of the writer that these matters needed more careful study, but did offer a field for endeavor in Memphis, as practically everywhere at the present time, through which some saving of life in early infancy might be effected.

### **Conditions Apparently Associated With High Neonatal Death Rate From Other Than Natal and Prenatal Causes**

It is the deaths between the first week and the first month of life and from other than natal and prenatal causes which account for the large increase in the neonatal death rate in 1933 and 1934 over previous years. (Charts 4 and 5, pp. 7-8. See also tables 2 and 3, pp. 81-82.) Most of the deaths of infants 1 week to 1 month of age in 1933 and 1934 occurred at the Memphis General Hospital and were those of infants who were born there and remained there until death. A few were of infants who were born at home under the home-delivery service of the Memphis General Hospital and were taken to the hospital immediately after birth, either with the mother who was hospitalized for one reason or another or because of the condition of the child. A few were admitted to the hospital a short time before death, having become ill at home. A few had been discharged from the hospital and readmitted in serious condition, usually shortly after discharge. Most of these deaths of infants from 1 week to 1 month of age were due to infections—variously diagnosed as respiratory, gastrointestinal, and unknown—the majority apparently from an epidemic which occurred to a limited degree in St. Joseph's Hospital in 1933 and to a large degree in both 1933 and 1934 in the newborn wards of the Memphis General Hospital.

At St. Joseph's Hospital in 1933, the recognition of an epidemic among the newborn, though the cause was not determined, was met by closing the obstetric and newborn wards for a time and establishing the service



in a different section of the building. This resulted in the prompt subsidence of the excess of deaths of the newborn after the first week of life from acute infections.

#### **Inadequacy of isolation facilities in the maternity and newborn wards of the Memphis General Hospital.**

At the Memphis General Hospital during a similar epidemic it was not thought possible to close the wards, although every effort was made to isolate patients. The dearth of running water in convenient places in both the wards in which maternity patients are cared for and those in which the newborn are housed in the Memphis General Hospital must be considered a factor of great importance in this connection. It seems likely that some infections were transmitted as a result of the frequent inability of the nurses to wash their hands thoroughly when they went from one patient to another.

It is apparent that the increase in the number of births at the Memphis General Hospital has resulted in serious overcrowding in the maternity wards and in the nurseries for the newborn, and in overloading of the nursing staff as well. The obstetric and pediatric staffs and the nursing staff of the hospital recognize most keenly the need for more space and more nursing personnel. Facilities for the proper isolation of infected women on the maternity service, as well as washing facilities, are inadequate. The same nurses take care of infected and noninfected patients. The delivery-room nurses do no nursing on the ward, but they admit all patients, some of whom are infected. The wards are frequently much overcrowded, particularly for 2-week periods four times a year when patients who at other times would be scheduled for home delivery by medical students are brought into the hospital for delivery.

Although the mortality among the prenatal-clinic patients is relatively low, the mortality among the so-called nonclinic patients in the hospital is extremely high, and many of these women have infections. Every woman who is pregnant is admitted to the obstetric ward, and the case is later referred elsewhere for treatment if indicated—abortions, surgical cases, and infections such as pneumonia and typhoid. Efforts are made to isolate infections, but the same nurses take care of the infected cases and the noninfected cases delivered on the ward. At the time of the writer's visit to the hospital there was in the ward a prenatal patient with a breast abscess, which had been opened and drained; also a patient who had been admitted 2 weeks postpartum with multiple abscesses. The case records of maternal deaths in the annual reports of the Memphis General Hospital obstetric service contain a few examples of infections without adequate explanation. It may well be that conditions just described afford such an explanation.

The newborn nursing service is separate from the obstetric service but in neighboring quarters, and the possibility of cross infections must be

borne in mind. But apart from this, washing facilities are inadequate, and the space is entirely inadequate for the isolation of infected infants. Space and nursing facilities for isolation and treatment of such infections are absolutely essential. Facilities for the care of the premature are also inadequate, and many premature infants die from infections.

Provision of more adequate facilities, therefore, for isolation of infected maternity cases and for the protection of the newborn from infections is the outstanding need at the Memphis General Hospital.

#### **Social problems.**

In 1934, for which period brief case histories of all infant deaths are available, a certain number of infants became ill from infections shortly after they went home, and died in the first month of life either at home or on readmission to the hospital. This points to the great importance of a closer tie-up between the hospital and the public-health nurses, so that home-nursing visits are made immediately and the mothers given instruction in caring for the babies. This situation also suggests the importance of adequate social-service facilities, coordinated with the public health nursing service, for aid in providing the minimum requirements for a wholesome home environment for mothers and newborn babies in need of such aid. Again, examples of babies under 1 month of age becoming very ill at home and dying either there or at the hospital soon after admission, who have had no nursing visits for a relatively long period, indicate the need of informing families as to the services which the nurse can offer and instructing them clearly how to get in touch with her early.

## *Mortality in the Second to Twelfth Month and Associated Phenomena*

Although it is obvious that the outstanding problem in Memphis is the neonatal one which has just been discussed, the death rate among infants from the second to the twelfth month of age offers a fertile field for improvement.

For this period of life the deaths of infants not born in Memphis form a large proportion of the total deaths, particularly among the white infants. In 1934 there were only four infants—two colored and two white—dying in the second to the twelfth month of life who had been born in Memphis of nonresident mothers and had remained there until death; all other infants of nonresident mothers dying in the second to the twelfth month had come from outside the city. Of the total deaths in the second to the twelfth month of life in 1934, 37 percent were of infants born outside the city—53 percent of the white and 21 percent of the colored. (Chart 21. See also table 17, p. 90.) But in spite of the relatively high proportion of deaths of infants born outside the city the death rate among infants of resident mothers, particularly the colored, is high for this age period.

### **Where Infants of Nonresident Mothers Died in the Second to the Twelfth Month**

Inasmuch as the deaths of infants of nonresident mothers from the second to the twelfth month of life are almost entirely those of infants who come from outside the city for care because of illness, the question of importance in relation to this group is whether their deaths are the result of inadequate care in Memphis. All the deaths of white infants in this group in 1934 and 20 out of 24 deaths of the colored in 1934 occurred in hospitals. (See table 39, p. 101.) The kind of care to be considered, therefore, relates, for all practical purposes, to hospital care. A study of available information as to deaths of these nonresidents in 1934 makes it evident that for the large majority Memphis had practically no opportunity to give care in time, for they came in desperately ill—in many instances moribund—and died shortly after admission to the hospital.

## Where Infants of Resident Mothers Died in the Second to the Twelfth Month

In 1934 almost two-thirds of the deaths in the second to the twelfth month of infants of resident mothers occurred in hospitals, a slightly higher proportion of the white than of the colored. (See table 39, p. 101.) Again, 21 out of 43 white resident deaths and 47 out of 79 colored resident deaths occurred in the Memphis General Hospital—evidence, as for the neonatal deaths, that a very large proportion were among infants needing free care. Of the colored infants who had died at home more than half had been delivered by the Memphis General Hospital obstetric service, so that the proportion of colored infants needing public care was even larger than is indicated by the Memphis General Hospital deaths. Among white infants who had died at home the same is true, although not to the same degree as for the colored.

### Causes of Mortality in the Second to the Twelfth Month

The respiratory diseases take the highest toll among the infants of resident mothers in Memphis during this period of the first year. (Charts 17-19. See also table 13, p. 87.) They account for approximately one-third of the mortality in the second to the twelfth month among both colored and white. The death rate from them is two and one-half times as high among the colored as among the white. The greatest opportunity therefore, for reducing the mortality in this period of the first year lies in control of respiratory diseases. In connection with the excessively high death rate from respiratory diseases among the colored infants, the possibility of tuberculosis as an important underlying cause must be borne in mind, in view of its very high incidence among the colored population in Memphis.

Mortality from gastrointestinal diseases forms a relatively small proportion of the mortality among resident infants, but these diseases are largely preventable causes of death. Deaths from natal and prenatal causes during this period include deaths from congenital syphilis, which are in large part preventable.

A striking finding with regard to the resident infants who died in 1934 was the very large proportion of colored babies who had been entirely breast fed. Many of them were babies old enough to have had the necessary vitamin-rich foods, such as orange or tomato juice and cod-liver oil—and additional foods, such as cereals and vegetable broths. One wonders to what degree they received these foods. One wonders also about the quality of the breast milk. In other words, was there an underlying nutritional inadequacy among many of these colored breast-fed infants who died of respiratory diseases, which lowered their resistance to infection?

The relatively large number of infants dying in the second to the twelfth month whose mothers had syphilis—infants whose deaths were attributed to other causes than syphilis—suggests the importance of more intensive observation and treatment of young babies for syphilis, and brings up again the need for more adequate facilities for this purpose.

### Public Facilities for Care of Infants

The high incidence of deaths in the second to the twelfth month among those receiving public medical care is evidence that adequate public facilities for the prevention of disease and the care of sick infants are of primary importance in reducing the death rate during this period of the first year, as they are in the neonatal period. The first question for consideration in this connection therefore concerns the nature and adequacy of such facilities in Memphis.

#### Child-health centers.

Child-health clinics, conferences, or centers are the means by which communities have endeavored to provide facilities for medical supervision of babies and preschool children for those who cannot afford to get such supervision privately, in order to promote normal growth and development and so far as possible to prevent disease and unnecessary deaths. Indeed, some communities have considered child-health conferences so essentially educational in nature that they have put no financial limitations on the people who might attend them but have considered the conferences a public activity for the public good analogous to the public schools. Such clinics or conferences should be under medical direction, preferably that of a physician specializing in pediatrics, with nursing assistance in the actual running of the clinic and for what is generally called follow-up—the interpretation of the doctor's advice to the mother and giving her what practical assistance is necessary in teaching her how to carry it out.

Child-health centers in Memphis until 1929 were limited to the Memphis General Hospital, where three such conferences are held each week—one a so-called 6-weeks clinic, where mothers come for postpartum examination for themselves and their babies; the other two, a colored and a white well-baby clinic. These conferences were organized by the department of health about 1922, and both medical supervision and nursing service for them have continued under that department.

No other child-health center for white children existed in the city until 1929, when one was established at the Baptist Good Will Home. In 1932 the Regina Health Center and a center at the Jewish Neighborhood House were established. In 1934 a center in the Highland district, and in 1935 one in Hollywood and one in the Gaston center were set up. These neighborhood health centers have developed largely through the



leadership of the health department under the sponsorship and with the cooperation of various community groups. They now number six in addition to the one at the Memphis General Hospital. Private physicians give voluntary service at all these centers except Hollywood and the Memphis General Hospital, where they are staffed by a physician employed on part time by the health department. The health-department public-health nurses of the districts in which the centers exist furnish the nursing service for these conferences. The following statement, issued by the city health department, describes the policies and organization of the centers for white children:

Child-welfare clinics are educational and intended to provide periodic medical supervision and immunization against the preventable diseases (diphtheria and smallpox) for infants and preschool children whose parents are unable to pay for the services of a private doctor.

For children under 6 years of age only.

Sick children are not admitted.

No prescriptions written, medicines or treatments given.

Sick children are referred to family doctor or in indigent families to Memphis General Hospital or its out-patient department.

The cooperating agency is expected to assume responsibility for the following:

The services of an adequate staff of physicians, preferably one a pediatrician. (Not more than four, each to serve once a month.)

The clinic space and its equipment which can be very simple, inexpensive, and home-made as an educational demonstration.

At least one lay worker who will help with records, act as hostess, etc.

Clinic to be held same day and hour once each week in the early afternoon, if possible.

The health department will assume responsibility for the following:

Follow-up work in the homes.

Clinic records.

Medical supplies and immunization material.

The services of a public-health nurse at each clinic.

The duties of the nurse will be assisting the doctor, giving group instruction to mothers on problems of infant and child hygiene; interpreting the doctor's orders and instructions to the parents.

Since 1930 five additional centers for colored babies have been established—one at a community center, the other four at public schools. Colored physicians who volunteer their services for these centers spend at least six consecutive clinic sessions at the colored well-baby clinic of the Memphis General Hospital. Recently the colored well-baby clinic at the Community Center has been taken over by the physician employed by the health department, who conducts the Memphis General Hospital and the Hollywood center. The visits to these permanent colored clinics (exclusive of the six weekly well-baby clinics at the Memphis General Hospital) have grown from 269 in 1932 to 4,702 in 1934.



The response of both white and colored parents to the establishment of these permanent centers is indicated by the growth in the number of visits to them. At the well-baby clinics of the Memphis General Hospital the number of visits has increased from 891 in 1929 to 2,615 in 1934; at the other well-baby clinics the number of visits has grown from 520 in 1929 to 6,778 in 1934. (These include some preschool children, but the largest proportion are infants.)

#### **Home visits by health-department nurses for health supervision of infants.**

The public health nursing service of the Memphis Department of Health has devoted a considerable proportion of its time to home visits for health supervision to babies in Memphis. Such visits began in 1921 with 120 visits; by 1925 they reached 6,202; in 1926, 20,164; in 1929, 21,916; in 1930, 24,211. Since then there has been a gradual yearly increase so that 27,021 visits were reported in 1934.

#### **Facilities for medical care for sick infants in families unable to afford private care.**

Medical care for sick babies whose parents cannot afford private care is provided by the Memphis General Hospital and the University of Tennessee Medical School; nursing care for sick babies in their homes is given by the health-department public-health nurses, who give a limited amount of bedside care to the sick as part of their generalized nursing program. The Metropolitan Life Insurance Co. nurses also give bedside nursing care to sick babies who are insured with the company.

That the health educational work of the public-health nurses in the home, the supervision of well babies at the well-baby clinics, and the care given sick babies in the Memphis General Hospital and its outpatient department have been important influences in reducing the death rate from the second to the twelfth month admits of little doubt. The question may well be asked why the reduction in the infant death rate during this period of the first year has not been greater.

### **Limitations to the Effectiveness of Infant-Health Supervision in Memphis**

It is quite apparent that although the development of neighborhood child-health centers since 1929 represents a very important forward step, these centers as at present organized are limited in their effectiveness. This fact makes it impossible to judge whether the number is adequate. In the first place, in a number of them four physicians volunteer their services and rotate so that each physician serves only 1 week in a month. Although an effort is made to have patients see the same physician, once a month is frequently too long an interval for effective supervision, particularly in the first 6 months. Again, the effectiveness of the centers is limited by the fact that there is no coordination of the medical services in the different centers, with the opportunity which such coordination

would provide for regular staff conferences to discuss common problems and ways and means of meeting them, and to develop standards of procedure.

In most of the centers, too, an excellent opportunity for group education through posters, demonstrations, and other means is missed because, the space used being available only for the time of the conference, equipment cannot be set up. This is particularly true of the colored centers.

The public-health nurses apparently make an adequate number of home visits to infants under a year, according to the appraisal-form standards of the American Public Health Association. One wonders about the quality of some of the visits, in view of the lack of a specialized nursing supervisor for child health and of specialized medical supervision. The supervisor of the public-health nurses was of the opinion that the nurses greatly needed both specialized nursing supervision and medical supervision, particularly the latter.

### **Inadequacies in Provision for Care of Sick Infants**

The in-patient pediatric service of the Memphis General Hospital cares for sick infants whose parents cannot afford private care. It is housed in a separate well-built and well-equipped building. The isolation unit of the Memphis General Hospital is equipped to care for children with communicable diseases. The only obvious improvement in equipment which seemed indicated was the provision of additional cubicles, particularly for children after the initial isolation period, so that the chances of cross infections might be minimized. The desirability, too, of a hospital situated in the suburbs to which children could be sent for convalescence merits serious consideration. It would lessen the time of children in the hospital and would also send them home in much better general condition.

The care of sick infants, particularly infants not seriously ill who do not need hospital care, presents a serious problem in Memphis. All preventive efforts stress attention to early symptoms of disease in order to prevent serious illness and death; yet the pediatric out-patient department of the Memphis General Hospital is the only institution in the city caring for such infants, and it is open only 3 days a week. There are no facilities for medical care for babies who are ill on other days unless they need hospital care, in which case they can be taken directly to the receiving ward of the hospital.

#### **Social problems.**

Again, as was stated early in this report, it must be borne in mind that neither health services for the prevention of disease nor medical services for its treatment can function efficiently if underlying basic necessities of living are lacking or inadequate. Conferences with the district nurses regarding the problems they met in the families visited left an

impression of great want, particularly among the colored. The nurses especially pointed out families in frequent need of milk, ice, fuel, and nursing bottles, and of car fare for visits to the clinic. They also pointed out the need for educating families as to methods of spending their income to the best nutritional advantage. Many of the colored mothers worked out, and the babies were left during the day to be cared for by older sisters and brothers—themselves but children. Obviously to meet such a situation various measures are necessary, including development of more adequate relief, permitting mothers of infants to remain at home, and some simple training of older girls and boys in the essentials of infant care—something analogous to little mothers' clubs.

The nurses stated that needs of families on relief were reported to the emergency relief offices but that they were not always met. The emergency relief executive in an interview showed appreciation of the need, but explained her dependence largely on appropriations from State and Federal governments and the obvious necessity of keeping relief within the funds available.

# *Special Groups in Memphis in Relation to Infant Mortality*

## **Infants of Unmarried Mothers**

Infant-mortality studies have shown that the mortality of infants of unmarried mothers is generally very much higher than that of other infants.<sup>13</sup> The death rate among this group, however, has been very much reduced in those places where social measures have been adopted for the protection of mothers and infants under conditions which assure the kind of care young infants need, and where recognized standards of care have been set up and carried out for those infants who for various reasons have not been kept with their mothers.

The three maternity homes in Memphis caring for white unmarried mothers—the Bethany, the Beulah, and the Ella Oliver—submitted records of 196 births in 1933 and 1934. The number of infants born to girls staying at these maternity homes does not, however, represent the total number of births to unmarried mothers in Memphis, as a number are cared for privately. Statistics showing the total number are not available at the present time. Many of the unmarried mothers who seek refuge in Memphis are nonresidents.

The girls at the Bethany and Beulah homes are taken to the prenatal clinic of the Memphis General Hospital for prenatal supervision and to the Memphis General Hospital for delivery.

The girls at the Ella Oliver Home are delivered there, as it has its own delivery rooms and equipment. Any physician chosen by the girl may deliver her at the home. In practice, most of the deliveries are done by one physician.

There were no maternal deaths of girls under the care of these homes in 1933 and 1934. The Bethany reported the loss of a large number of infants in 1933-34 in the "epidemic" at the Memphis General Hospital. The number of deaths of infants reported by these homes obviously does not necessarily give a complete picture because of the varying length of time the infants are kept at the homes. A number of years ago the maternity homes agreed, at the request of the health department, to keep mothers and infants together in the maternity homes for at least 3 months, whenever this was possible. In practice this is not generally done. At

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<sup>13</sup> See *Causal Factors in Infant Mortality*, p. 181 (U. S. Children's Bureau Publication No. 142, Washington, 1925).

the Beulah Home it was stated that although an effort was made to keep the girls for 6 months, most of the infants are placed with the Tennessee Children's Home Society—usually at 3 to 6 weeks of age. At the Ella Oliver Home it was stated that the girls usually stay about 1 month after delivery, but that their infants are generally placed with the Tennessee Children's Home Society before the mothers leave. At the Bethany Home the superintendent stated that they try to keep mothers and infants together for 3 months for breast feeding but that it often does not work out that way.

The Tennessee Children's Home Society accepts on court commitment or on parental surrender dependent and neglected children not above the age of 7 years for placement for adoption. Pending such placement it cares for children in boarding homes. Supposedly only children physically and mentally sound and eligible for adoption come within the program of the organization, but in practice any child under the age specified may be received at least for care pending decision as to eligibility for placement. The organization has an agreement with the Memphis Family Welfare Society and the Memphis Children's Bureau that when children are found not placeable in free family homes, they can be turned over to these organizations for care. Often the Tennessee Children's Home Society works out a plan with relatives or with institutions for the care of such children.

Most of the infants taken over by the Tennessee Children's Home Society are children of unmarried mothers. An illegitimate child can be transferred to the society by his mother, who, if she is of age, can sign a surrender of the infant which gives the organization legal custody. Surrenders by girls who are minors must be approved by the court. Infants from outside Shelby County (unless the parents are living in Shelby County at the time of surrender) are transferred to the Nashville Receiving Home of the society. Infants kept under the direction of the Memphis branch are those who are born in Shelby County or whose parents are living there at the time of surrender. Many of these are nonresident girls who come to Memphis for delivery.

Because of the large number of infections in the newborn ward of the Memphis General Hospital, the executive of the Tennessee Children's Home Society stated that she preferred to receive the infants who were born there early, before they developed thrush or some other infection. Many of the mothers apparently sign their infants away before birth, and when this is done the Tennessee Children's Home Society is free to take the infant when it chooses.

This organization has a number of boarding homes in which it places the infants under its care. Those for very young infants were said to be homes of graduate nurses. One pediatrician supervises the feeding formulas in most cases, and a number of other physicians are on call for sick-



ness. On July 2, 1935, the executive of the society in Memphis stated that no infant had died since the beginning of the calendar year.

There is in Memphis a social agency devoting itself to problem girls of 16 to 25 years of age—the Church Mission of Help. Most of its cases are unmarried mothers. It attempts to work out with the girl and her infant a plan best suited to the individual. An effort is made not to dispose of the infant permanently for a year, either by having the mother keep the infant or by making arrangements for its temporary care if the mother cannot care for it, so that the mother may have an opportunity to demonstrate her ability to care for the child. If this is done, the agency continues to put in relief if necessary to keep mother and infant together. There were periods, however, in 1933 when the community fund was practically bankrupt, in which relief could not be gotten for this purpose, and it was necessary to put children in institutions and to release them for adoption when otherwise they might have been kept with their mothers.

Of 87 infants born alive to unmarried mothers, who were under the care of the Church Mission of Help in 1933 and 1934, 23 had died, 28 were living with their mothers, 1 was with relatives, and 22 were adopted. The rest were temporarily in the well-baby nursery at the Memphis General Hospital, or in boarding homes or orphanages.

Many unmarried mothers receive no help whatever from a social agency. For example, the Bethany Home is the only one of the three maternity homes which attempts social case work with the girls who come to it for care. This is done through the Church Mission of Help, to which all cases admitted to the Bethany Home are referred, except those sent in by the Travelers Aid, which handles dependency cases of nonresidents.

The experience of a few States has demonstrated that the best method of assuring that all unmarried mothers are given the assistance that they need in planning for and caring for their children is to make it the duty of a public department, preferably of a county welfare department with responsibility for public services for children, to see that such services are available in all cases.

The problem of the care of unmarried mothers and their infants is obviously not an isolated local one in Memphis but one which needs to be approached from the point of view of State planning and legislation. Memphis might well provide the leadership for such planning and legislation in Tennessee.

The first and most urgent need is that maternity hospitals, institutions, and boarding homes for infants be licensed and supervised by a public agency, which should help to develop adequate standards of care. Tennessee has laws which authorize licensing and supervision of institutions caring for children by the State department of institutions and licensing of maternity hospitals by the secretary of state on the recom-



mentation of the State department of institutions, but the State is not providing staff for these purposes. There is no legal provision for the licensing of boarding homes for infants.

During the time when there was a medical director of maternal and child health in the Memphis Department of Health, boarding homes were systematically inspected; there was no specific legal authority for such inspection, however, and inspection has lapsed since the resignation of the director of that service in 1928.

### Infants in Institutions

#### Orphanages.

There are few infants cared for at the two orphanages in Memphis—the Porter Home and Leath Orphanage and St. Peter's. These seem to play no role in the high infant mortality rate of Memphis.

#### Well-baby nursery at the Memphis General Hospital.

The so-called well-baby nursery at the Memphis General Hospital is a small ward in the pediatric hospital, which cares only for well infants. Every effort is made to protect the infants from infections and to promote normal growth through supervised feeding and individual attention and "mothering." When it was first established a number of infants placed in it died from respiratory infections. Since then, however, there has apparently been much improvement in the care of infants there. The Church Mission of Help reports that it places many infants there for temporary care with excellent results. At the present time this nursery cannot be said to be contributing to the high infant mortality of the city, but there seems to be a real question as to the advisability of keeping well infants in a hospital—even though they are in a ward of their own.

## *Summary*

### **General considerations.**

Infant mortality in Memphis, high in 1927 compared with that of other cities of its size, has shown an upward trend since then. This upward trend has been largely the result of a marked increase in neonatal mortality among both white and colored infants. There has also been an upward trend in mortality in the second to the twelfth month among white infants. Although the mortality in the second to the twelfth month among colored infants has shown mainly variability with a slight downward trend since 1930, the rate among them for this period of the first year in 1934 was higher than that among colored infants in most comparable cities.

The increase in neonatal mortality has been shown to be associated to a small degree with increase in mortality from natal and prenatal causes, to a greater degree with a large increase in mortality from other than natal and prenatal causes, which was especially marked in 1933 and 1934 as compared with previous years. The neonatal mortality of infants of resident mothers was not significantly different from the crude neonatal mortality in the years 1930-32 combined or in 1934.

The high crude mortality in the second to twelfth month period among white infants is apparently associated with the large number of deaths of nonresident white infants which occur in Memphis, for the resident mortality among white infants surviving the first month was significantly lower than the crude mortality among such infants, both in the 1930-32 period and in 1934. Deaths of nonresident white infants from gastrointestinal diseases apparently play a predominant role in the high crude mortality of this period of the first year among white infants.

The maternal and child-health program under specialized medical direction, which had been started in Memphis in 1921, apparently was a factor in the declining infant mortality of Memphis previous to 1928. Since 1928 specialized medical supervision has been lacking. Moreover, although in 1929 the available clinic and nursing services were considered by the American Public Health Association inadequate to meet the needs of a city with unusually high maternal and infant death rates, the needs of Memphis for expanded facilities were greatly increased by the annexation of a large territory at the end of 1929, which brought with it higher infant mortality than the old city. In addition, the depression has increased the need for health services in Memphis, as elsewhere. Moreover, it seems clear that social services in Memphis have not been able to meet the needs of many families for basic necessities, without which health services cannot function effectively.

**Neonatal mortality and associated phenomena.**

Although neonatal mortality is relatively high among all groups in Memphis, the major problem in relation to neonatal mortality there lies with the group receiving public care. This care is provided cooperatively by the public health nursing division of the Memphis Department of Health, the Memphis General Hospital, and the University of Tennessee Medical School. Since 1930 the number of patients cared for by the Memphis General Hospital obstetric service in both its in-patient and its out-patient delivery service has increased appreciably. In 1934 it cared for 21 percent of the white infants born alive in the city and for 83 percent of the colored infants born alive. Although there has been no increase in personnel, there has been a large increase in the volume of prenatal care given as shown by attendance at the prenatal clinic of the Memphis General Hospital and by home-nursing visits made by the department of health nurses.

The prenatal and natal care given by the health-department public health nursing service and the Memphis General Hospital obstetric service seems to have been an important factor in at least holding down the maternal mortality and reducing the stillbirth mortality and mortality among infants under 1 day of age, particularly among the colored. The group of women not receiving prenatal care from this service but delivered by it or admitted to the hospital shortly after delivery, although very small, had an extremely high maternal mortality and a high stillbirth mortality and incidence of premature births compared with those who had had prenatal care. However, the mortality in the first month of life from prenatal and natal causes (which include practically all the deaths in the first day) has increased. Improved prenatal care, both quantitative and qualitative, may be expected to decrease this mortality through more regular and intensive treatment of prenatal syphilis, more attention to the nutrition of the pregnant women, and more adequate supervision of the toxemias. Better postnatal care of the infant—particularly of the newborn, to prevent deaths from asphyxia, and of the premature—also offers hope for reduction in mortality from natal and prenatal causes.

The high mortality among infants from 1 week to 1 month of age and from other than natal and prenatal causes in the first month in 1933 and 1934—due mostly to infections—was associated largely with deaths which occurred at the Memphis General Hospital and for the most part deaths of infants who were born there and remained there until death. In 1933 St. Joseph's Hospital had a relatively large number of deaths during this period of the first month, but the recognition of their cause as infections resulted in the temporary closing of the obstetric and newborn wards and a subsidence of the epidemic.

With the increase in the number of maternity cases hospitalized at the Memphis General Hospital, there has been no comparable increase in space in the maternity and newborn wards of the hospital. Insufficient

facilities for adequate isolation of infections among cases in the maternity and newborn services seem to account for failure to control an epidemic at the Memphis General Hospital similar to the one at St. Joseph's Hospital and for the marked increase in 1933 and 1934 in neonatal mortality in Memphis from other than natal and prenatal causes.

**Mortality in the second to twelfth month and associated phenomena.**

A large proportion of the mortality in the second to the twelfth month in Memphis, particularly among white infants, is due to the deaths of nonresident infants. Most of these infants die in the hospitals in Memphis. In 1934 a large majority of them were brought in desperately ill—frequently moribund—and died shortly after admission to the hospitals.

Mortality among resident infants in Memphis in the second to the twelfth month is largely among the group needing free care. The most outstanding problem in this period is the high mortality from respiratory diseases among the colored. The possibility of syphilis as an underlying factor in many of the respiratory deaths must be borne in mind in view of its high incidence among the mothers of the infants who died, as also must the possibility of nutritional deficiencies and of tuberculosis. The prevention of gastrointestinal diseases and more attention to and treatment of congenital syphilis as such offer further opportunity for reducing the mortality from gastrointestinal diseases and natal and prenatal causes in this period of the first year.

Neighborhood child-health centers, which have been developed since 1929 to supplement the centers previously established at the Memphis General Hospital, represent an important advance in the protection of infant health in Memphis, but many of them are limited in their effectiveness by the lack of continuity of medical supervision and lack in many instances of facilities and equipment for educational work with parents.

The public-health nurses of the health department make a relatively large number of home visits for infant-health supervision. The desirability of improving the quality of this supervision through the provision of a specialized nursing supervisor for child health seems evident.

Facilities for hospitalizing at the Memphis General Hospital sick infants who cannot have private medical care seem reasonably adequate, but there is serious need for the provision of facilities for medical care in the early stages of illness. The pediatric out-patient department of the Memphis General Hospital, which is the only place where ambulant cases who cannot afford private care can get treatment, is open only 3 days a week.

The lack in the homes of such basic needs in the care of infants as milk, ice, fuel, and nursing bottles, the frequent lack of carfare for clinic visits, and the fact that many infants, particularly among the

colored, must be left at home during the day by working mothers, to be cared for as best they can by brothers and sisters, indicate the importance of considering ways and means of meeting the serious social problems which affect the care and the health of babies.

**Special groups in relation to infant mortality.**

For the unmarried mothers who seek care in Memphis for themselves and their infants, there appears to be real need for the development of a constructive social program under State leadership. Pending the development of an adequate program, which would necessarily include provision for both social and health aspects of the problem, the authority to license and supervise local maternity homes and hospitals and institutions and boarding homes for infants from the point of view of health should be given the local health department by city ordinance. Ultimately supervisory authority should be vested in State agencies.

The care of infants in orphanages seems to play no role in the Memphis infant-mortality situation, nor at the present time does the care of well babies at the so-called well-baby nursery of the Memphis General Hospital. It seems inadvisable, however, as a matter of policy, to care for well babies in a hospital.



## *Recommendations*

It is apparent from this brief investigation that a more detailed and probably a continuing study over a period of years is necessary as a basis for evaluating the various factors which may be influencing the infant mortality rate at a given time, and also as a basis for the development of a well-rounded effective program for preventing unnecessary infant deaths. Because of the relatively high proportion of births in Memphis to nonresident mothers and of deaths of nonresident infants there, and because of the large number of unmarried mothers who come to Memphis for care, the study should include—for a time at least—all births in the city and probably also all nonresident sick infants who are brought in to Memphis for care, as well as those who die. It should include a study of maternal care as well as the care of the newborn at least in all the hospitals in the city. It should include a few basic economic and social items as well as health and medical ones. Such a study would best be part of the activities of the health department with the cooperation of the medical profession, the hospitals, and the social agencies.

This brief investigation has shown clearly, however, the need for specialized medical supervision of maternal and child-health activities to coordinate the work in the city, to direct the continuing study, and to develop an adequate program for maternal and child health in Memphis, which would include both educational health measures aimed at prevention and adequate provision for the care of the sick. Such a program should be developed with the cooperation of medical and public health nursing groups, health and social agencies, and the general public.<sup>14</sup> In addition, certain recommendations as to concrete measures to be taken immediately in the development of the maternal and child-health program can be made as a result of the findings of this investigation. They are:

1. The immediate provision of more space and facilities in the maternity pavilion of the Memphis General Hospital, particularly for the care of the newborn.
2. The provision of medical supervision for individual cases on the home-delivery service of the Memphis General Hospital. The entire dependence of the home-delivery service of the Memphis General Hospital and the health department on medical students of the University of Tennessee is a situation which should be remedied. Among other things such direct medical supervision would eliminate by making unnecessary the periodic great overcrowding at the hospital which occurs

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<sup>14</sup> A director of maternal and infant hygiene in the Memphis Department of Health was appointed in the summer of 1935.

when the patients scheduled for home delivery by medical students are brought to the hospital during periods when the students are not available. The cost of such medical supervision might well not exceed the cost of hospitalization.

3. The development of much closer working relationships between the hospital, the public-health nurses, and the social agencies in order that the basic minimum needs of mothers and infants not otherwise provided for may be met promptly. If community funds are inadequate for the provision of workers and the meeting of minimum material needs this should be pointed out to the public so that an effort can be made to meet the situation constructively.

4. The provision of some form of medical care in their own homes, in daily clinics, and by public physicians for those infants not seriously ill whose families cannot afford private care.

5. The provision of more permanent quarters for child-health centers, so that they can be really educational in the larger sense; the provision of more continuity in medical supervision of these centers, preferably through payment of pediatricians for their services. The medical as well as the nursing service for these centers should be under the jurisdiction of the health department.

6. The provision of more prenatal-clinic sessions.

7. The provision of more adequate facilities for the treatment of syphilis.

8. The legal authorization of the health department to license and supervise maternity homes, institutions, and boarding homes for infants.

There seems little doubt that the various needs which have been pointed out can gradually be met in Memphis through the coordination and development, and in some cases the expansion, of already existing agencies. Some recommendations can and should be carried out immediately; others should follow the most careful consideration of what would be the best plan in the light of the specific problems and the resources in Memphis. Because of the close interrelation between the services of the health department, the Memphis General Hospital, and the University of Tennessee, it seems especially desirable, indeed necessary, that these three agencies seek together to plan for the best method by which the necessary increased health and medical services for mothers and babies may be provided. It seems also necessary and desirable that the medical profession as a whole, the community social agencies, and representatives of important lay groups be brought to counsel together so that there may be intelligent understanding of the need and public support for what may be necessarily increased expenditures to meet it.

**Recommendations as to Memphis Department of Health activities.**

The first step indicated is the appointment of a director of maternal and child health—one with special training and interest in pediatrics, obstetrics, and child health<sup>15</sup>—whose function will be to study continuously and to point out conditions inimical to the health of mothers and babies and to develop, with the cooperation of other branches of the health department, the medical and nursing professions, the hospitals, the social agencies, and the public, ways and means of remedying them through a well-rounded program of maternal and child health, adapted to specific needs in Memphis. A budget adequate to develop such a program should be provided. Such a program would include:

1. The development of an adequate number of permanent prenatal and child-health centers with facilities and equipment for educational work with parents at these centers, and with continuity of medical supervision.
2. The gradual expansion of the public health nursing service, with the provision of specialized nursing supervision for maternal and child health.
3. The development of increased facilities for the treatment of syphilis, particularly among pregnant women and among children.
4. The development of nutrition work, particularly among low-income families, who need help in learning how to spend their money for food to the best advantage.
5. The authorization of the health department by city ordinance to license and supervise maternity homes and institutions and boarding homes for infants.

**Recommendations as to the Memphis General Hospital.**

1. More adequate space and facilities in the maternity pavilion for maternity cases and for the care of the newborn, with special consideration of the need for adequate isolation facilities both in the wards caring for maternity patients and in those caring for newborn infants. Special provision for the care of premature infants is essential. There is immediate need for hot and cold running water in convenient places, in both the newborn and maternal sections, in order that nurses may and will wash their hands before going from one patient to another.

2. More cubicles in the pediatric section would be advantageous.
3. When feasible, the question of a convalescent children's hospital should be given serious consideration.
4. The well-baby ward of the hospital should be abolished.

**Recommendations as to cooperative activities of the Memphis Department of Health, the Memphis General Hospital, and the University of Tennessee Medical School.**

1. The close cooperation which has always existed between the city health department and the hospital in the maintenance of the prenatal

<sup>15</sup> Such an appointment has been made.

and 6-weeks postpartum clinics and the well-baby clinics through the attendance of the public-health nurses at the clinics is very desirable. The public-health nurses, however, should not have complete responsibility for running the prenatal clinics; hospital nurses should be provided for this, so that the time of the public-health nurses can be spent in educational activities with the patients. At the present time the mechanics of managing the clinics absorbs all the time of the public-health nurses assigned to them.

2. Crowded prenatal-clinic sessions and the need for more sessions have been pointed out. The difficulty of providing for extra service with the present medical personnel, which is voluntary except for the resident in obstetrics, has been pointed out by the obstetrician in charge of the clinic. This is a matter for joint consideration and planning by the University of Tennessee Medical School, which provides the medical service for the hospital, the Memphis General Hospital, and the health department. In connection with this, consideration should be given to the feasibility of establishing outlying prenatal clinics as part of the hospital and health department set-up, rather than merely increasing the number of sessions at the hospital.

3. More convenient and adequate provision should be made for the treatment of syphilis, especially syphilis in pregnant women and in children.

4. The home-delivery service should be under direct medical supervision.

5. Well-trained social workers should be appointed for work in the prenatal clinics, in the obstetric and pediatric departments of the hospital, and among cases referred by doctors and nurses as needing help, to act as liaison officers with the community social agencies in order that families with children who are without the minimum basic necessities for health protection may be effectively and quickly aided.

6. Careful consideration should be given to ways and means of providing early medical care in their homes for babies not ill enough for admission to the hospital. Probably the most satisfactory method of providing this would be through a service provided by the hospital and the University of Tennessee Medical School.

#### **Recommendations as to social problems.**

1. Every effort should be made to stimulate community interest and sense of responsibility so that funds are provided both to develop the necessary health program and to assure the provision for minimum basic needs when necessary—without which provision many preventive and curative activities are limited in their effectiveness.

2. The social aspects of the care of unmarried mothers and illegitimate or otherwise dependent and neglected infants should be given careful study in relation to the development of an adequate State program that meets accepted modern standards.



## Appendix 1.—The Resident Infant Mortality Rate of Memphis

From the data available it is not possible to formulate an accurate resident infant mortality rate according to the accepted definition of the term. In order to arrive at such a "resident" infant mortality rate, it is necessary to know: (1) The number of births to resident mothers; (2) the number of deaths of infants born to resident mothers; (3) the number of births to nonresident mothers; (4) the number of deaths of infants born to nonresident mothers in Memphis; (5) the number of deaths of infants who were not born in Memphis or if born in Memphis of nonresident parents had returned home and reentered Memphis before their death; (6) the number of births to resident mothers outside Memphis; and (7) the number of deaths of infants of resident mothers outside Memphis. Information on the last two points is not now available, but all this information will be made available for all cities under the plans of the United States Bureau of the Census, so that it will be possible to compile city resident rates that will be comparable.

It is however, possible to estimate the probable effect of births and deaths of infants of nonresident mothers in Memphis and the deaths of infants not born in the city, on the Memphis picture, for the years 1930-32 combined and 1934.

In order to have a clear picture of the situation and the basis on which conclusions to be presented here have been reached, it is necessary to consider the method used by the health department in classifying births and deaths as to residence, and the question of the validity of the residence statements on birth and death certificates.

### Method of classification of infant births and deaths by the Memphis Department of Health as resident and nonresident.

For a number of years births have been classified as resident or nonresident according to the address of the mother given on the birth certificate. Until 1934, however, all deaths in Memphis of infants who had been born there and had resided there until death were classified as resident; all deaths in Memphis of infants who were not born in Memphis or who were born in Memphis but had returned home outside of the city and reentered Memphis before death were classified as nonresident. The so-called resident infant deaths, therefore, included the deaths of infants born in the city to nonresident mothers and classified as nonresident births. In other words, infants born in the city of nonresident mothers were eliminated from the resident births, but when any of these infants died they were included in the resident deaths. The so-called resident infant mortality rate computed yearly by the city previous to 1934 has, therefore, obviously been erroneous. This method of classification has resulted in resident rates that are probably somewhat higher than actually obtain; it is impossible to estimate the degree of excess.

In 1934, instead of considering as nonresident only the deaths of those infants not born in the city, there were added to this group the deaths of infants born in the city of nonresident mothers. This latter method of classifying the deaths as well as the births of infants born in the city of nonresident mothers as nonresident, will obviously give a more accurate picture of the infant death rate of *actual residents* in Memphis living in Memphis at the time of death.



### Validity of residence as given on birth and death certificates and its effect on resident infant mortality rate.

A very important question which has been raised concerns the validity of the residence as given on the birth and death certificates. Because free care at the Memphis General Hospital, except in serious emergencies, is supposed to be limited to residents of Memphis and Shelby County and to nonresident indigent unmarried women staying at maternity homes in the city, it was felt that many individuals who came to Memphis to get free hospital care, either at the time of or shortly before their babies' birth, either gave fictitious addresses or addresses of relatives or friends which made them appear as residents of Memphis when they were in reality nonresidents. This, too, was thought to be the case with some of the babies dying who were not in reality residents of Memphis. In other words, the number of births listed as resident (in the sense that they were births to resident mothers only) was probably higher than in actuality, and possibly also the number of infant deaths.

The only way in which an absolutely accurate number of births to resident mothers can be obtained is by inquiring for every birth specifically not only as to the residence of the mother but also as to the time when the mother came to Memphis. This has not been done. The same holds true for the deaths of infants of resident mothers, though the latter would be taken care of automatically if the birth-certificate information is correct.

In 1934, however, a study was made by the health department of the death of every infant under 1 year of age in Memphis during that year, the original schedules of which were made available to the Children's Bureau for analysis. A special effort was made to determine residence accurately by inquiring as to the actual date on which the child had come to the city; if the child had been born there, the date on which the mother had come to the city. A comparison of infant death certificates for 1934 with the birth certificates revealed that of the 517 infants who died in Memphis during the year 428 (194 white, 234 colored) had been born in Memphis. The address of the mother was given on the birth certificate as Memphis for 382 (154 white, 228 colored) of these 428 births. The special inquiry revealed that the original birth-certificate classification was correct for 354 births (93 percent); but the birth certificate had given a Memphis address for the mother in 28 instances (14 white, 14 colored) in which she was nonresident (table A). It is significant, as indicating that the problem of validity of "residence" is practically limited to the first month, that 24 of the changes from the resident to the nonresident classification were for infants who died under 1 month of age and the other 4 were for infants only slightly over 1 month old—who, indeed, had never left the hospital where they were born.

TABLE A.—Result of inquiry regarding residence of mother for infants dying in Memphis, Tenn., whose birth certificate stated mother to be a resident of city; 1934<sup>1</sup>

Period of life	Infants dying in Memphis whose birth certificate stated mother to be resident of city				
	Total	Inquiry showed—			
		Mother resident		Mother nonresident	
	Number	Percent	Number	Percent	
<b>TOTAL</b>					
First year.....	382	354	92.7	28	7.3
First month.....	256	232	90.6	24	9.4
Second to twelfth month.....	126	122	96.8	4	3.2
<b>WHITE</b>					
First year.....	154	140	90.9	14	9.1
First month.....	109	97	89.0	12	11.0
Second to twelfth month.....	45	43	( <sup>2</sup> )	2	( <sup>2</sup> )
<b>COLORED</b>					
First year.....	228	214	93.9	14	6.1
First month.....	147	135	91.8	12	8.2
Second to twelfth month.....	81	79	97.5	2	2.5

<sup>1</sup> Compiled from figures supplied by Memphis Department of Health.

<sup>2</sup> Percent not shown because number of deaths was less than 50.

The official birth-certificate and death-certificate addresses were changed by the Memphis Department of Health from resident to nonresident for these 28 cases and for 1 more (the twin of a colored infant who died whose residence had been changed from resident to nonresident). It is apparent that the numbers of resident live births as finally listed by the health department for official use were, therefore, only slightly and insignificantly different from the numbers as compiled from the original birth certificates—less than 1 percent as a whole and for both white and colored (table B).

TABLE B.—*Live births to mothers certified as resident, number as corrected after inquiry of infant deaths, and estimated number of live births to resident mothers on basis of inquiry; Memphis, Tenn., 1934*<sup>1</sup>

Color	Live births to resident mothers		
	Number certified to resident mothers	Number as corrected after inquiry	Number estimated on basis of inquiry
Total.....	3,982	3,953	3,673
White.....	2,195	2,181	1,995
Colored.....	1,787	1,772	1,678

<sup>1</sup> Compiled from figures supplied by Memphis Department of Health.

It is apparent also that the resident infant mortality rate computed on this basis is probably lower than the actual rate, as reallocation as to residence has been made for all the deaths but not for all the births—only for the births of the infants who died. Whether the same percentage change in residence classification would occur if all births were carefully inquired into, it is, of course, impossible to say; it seems likely, however, that the change would not be so large among those who lived as among those who died, in view of the probability that an abnormal condition prompted some of the mothers of the infants who died to seek care in Memphis. Nevertheless it seems justifiable for purposes of study to consider the group of births studied as a sample—to apply the percentage distribution of resident and nonresident births among it to the total number of live births, and compute the resident infant death rate on this basis. Such an estimate would seem to be a closer approximation of the actual situation than either the original figures of the health department or the corrected figures of the special study.

For 1934, therefore, the mortality rates among infants of resident mothers have been computed on the basis of (1) resident infant deaths and resident live births as on the original birth and death certificate records, (2) resident infant deaths and resident live births as reallocated by the health department following a study of infants who died in the city during the year, and (3) resident infant deaths as reallocated by the health department following the study of deaths and resident live births estimated on the basis of percentage distribution of resident and nonresident births among 428 deaths of infants born in the city that were made the subject of special study (table C).

TABLE C.—Mortality in certain periods of the first year of life<sup>1</sup> among all infants born in Memphis and among infants born to resident mothers, 1934

Period of life	Crude rate <sup>2</sup>	Resident rates based on records <sup>3</sup>		
		Originally certified	Corrected after inquiry of deaths <sup>4</sup>	Estimated on basis of inquiry
<b>First year</b> .....	<b>112.4</b>	<b>95.9</b>	<b>89.6</b>	<b>96.4</b>
White.....	92.5	70.2	64.2	70.2
Colored.....	142.7	127.6	120.8	127.5
<b>First month</b> .....	<b>68.7</b>	<b>64.3</b>	<b>58.7</b>	<b>63.2</b>
White.....	57.2	49.7	44.5	48.6
Colored.....	86.2	82.3	76.2	80.5
<b>Second to twelfth month</b> .....	<b>46.9</b>	<b>33.8</b>	<b>32.8</b>	<b>35.5</b>
White.....	37.4	21.6	20.6	22.7
Colored.....	61.9	49.4	48.3	51.2

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census; rate based on all live births in Memphis.

<sup>3</sup> Compiled from figures supplied by Memphis Department of Health.

<sup>4</sup> Official resident rates of Memphis Department of Health.

The differences among these various resident rates are of no statistical significance. The lowest are the official rates of the health department—and, as has been mentioned, they are probably too low. In other words, although the special study of infant deaths revealed that certain births and deaths were classified as resident instead of nonresident because of inaccurate reporting on the birth and death certificates, the actual effect of these inaccuracies on the resident infant mortality rate, at least in 1934, is apparently negligible, and the resident rate based on original birth- and death-certificate records probably is reasonably valid.

#### Comparison of crude infant mortality rates and mortality rates of infants of resident mothers.

Comparison of the crude rates and the rates for infants of resident mothers in Memphis for 1934 (table C) reveals that, as would be expected, for both races combined, and for white and colored separately, no matter which resident rate is used, the crude rates were higher for the total infant mortality and for both the neonatal and second to twelfth month mortality separately. The difference was greater for the white than for the colored, and for both white and colored it was greater for the second to twelfth month period than for the first month. The differences between the crude rates and the rates for infants of resident mothers among the colored for the whole year, the neonatal period, and the second to twelfth month period were not statistically significant. Among the white the differences between the crude rate, the rate for infants of resident mothers for the whole year, and for the second to twelfth month period were statistically significant. Those for the neonatal period probably were not, for the resident white neonatal rates as estimated on the postulate that residence is probably as poorly certified for all infants born in Memphis as for infants who die, is not significantly lower than the crude white neonatal rate. (The official health-department resident rate, which, as was previously stated, is probably lower than the actual rate, is significantly lower than the crude rate.)

There happens to be available as a result of a special local study of infant mortality by wards a resident infant mortality rate for the period 1930-32, computed on the basis of live births to resident mothers in Memphis and deaths in Memphis of infants of resident mothers as recorded on the birth and death certificates. A comparison of these with the crude rates for 1930-32 reveals much the same differences as were found in 1934 between the crude and resident rates in the second to the twelfth month but in the neonatal rates an even smaller difference for the white and no difference for the colored.

## Appendix 2.—Tables

TABLE 1.—Mortality in certain periods of the first year of life<sup>1</sup> among white and colored infants; Memphis, Tenn., 1923-34<sup>2</sup>

Period of life	1923	1924	1925	1926	1927	1928	1929	1930	1931	1932	1933	1934
<b>First year</b> .....	<b>107.4</b>	<b>106.8</b>	<b>105.5</b>	<b>97.2</b>	<b>80.5</b>	<b>89.8</b>	<b>95.3</b>	<b>102.0</b>	<b>102.3</b>	<b>96.0</b>	<b>111.4</b>	<b>112.4</b>
White.....	76.3	69.9	68.8	72.7	63.9	67.3	73.0	80.8	82.9	76.2	93.0	92.5
Colored.....	169.6	166.2	172.6	141.2	107.9	130.1	137.0	138.6	137.0	126.7	140.1	142.7
<b>First month</b> .....	<b>52.8</b>	<b>51.3</b>	<b>47.9</b>	<b>45.8</b>	<b>41.1</b>	<b>45.1</b>	<b>60.4</b>	<b>55.5</b>	<b>49.1</b>	<b>55.8</b>	<b>71.2</b>	<b>68.7</b>
White.....	39.5	36.5	36.4	37.5	35.9	38.7	49.5	51.2	40.6	42.6	62.0	57.2
Colored.....	79.5	75.1	69.1	60.8	49.8	56.6	80.7	62.9	64.4	76.3	85.6	86.2
<b>Second to twelfth month</b> .....	<b>57.6</b>	<b>58.5</b>	<b>60.5</b>	<b>53.9</b>	<b>41.0</b>	<b>46.8</b>	<b>37.2</b>	<b>49.2</b>	<b>55.9</b>	<b>42.6</b>	<b>43.2</b>	<b>46.9</b>
White.....	38.3	34.7	33.6	36.6	29.0	29.7	24.8	31.2	44.0	35.1	33.1	37.4
Colored.....	97.9	98.4	111.3	85.6	61.2	77.9	61.1	80.8	77.7	54.5	59.5	61.9

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census, 1927-34, and by the Memphis Department of Health, 1923-26.

TABLE 2.—Mortality in certain periods of the first month of life<sup>1</sup>; Memphis, Tenn., 1927-34<sup>2</sup>

Year	First month	First week			Second week to first month
		Total	First day	Second to sixth day	
<b>TOTAL</b>					
1927.....	41.1	34.8	26.9	7.9	6.3
1928.....	45.1	36.7	27.2	9.5	8.4
1929.....	60.4	49.6	32.7	16.9	10.8
1930.....	55.5	44.5	27.9	16.5	11.0
1931.....	49.1	34.9	26.7	8.3	14.2
1932.....	55.8	43.2	28.2	15.0	12.6
1933.....	71.2	39.0	25.1	13.9	32.3
1934.....	68.7	40.0	22.6	17.4	28.7
<b>WHITE</b>					
1927.....	35.9	32.3	25.8	6.5	3.6
1928.....	38.7	31.5	22.4	9.1	7.2
1929.....	49.5	45.7	29.4	16.3	3.8
1930.....	51.2	42.5	27.7	14.8	8.7
1931.....	40.6	32.0	26.1	5.9	8.6
1932.....	42.6	35.4	22.9	12.5	7.2
1933.....	62.0	41.2	26.7	14.5	20.8
1934.....	57.2	36.0	22.3	13.7	21.2
<b>COLORED</b>					
1927.....	49.8	39.0	28.8	10.2	10.8
1928.....	56.6	46.2	35.8	10.4	10.4
1929.....	80.7	56.8	38.8	18.1	23.9
1930.....	62.9	47.9	28.4	19.5	15.0
1931.....	64.4	40.2	27.8	12.4	24.2
1932.....	76.3	55.3	36.5	18.8	21.0
1933.....	85.6	35.5	22.6	12.8	50.2
1934.....	86.2	46.1	23.1	23.1	40.1

<sup>1</sup> Deaths per 1,000 live births.

<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.

TABLE 3.—Mortality in the first month of life<sup>1</sup> from natal and prenatal causes and from all other causes; Memphis, Tenn., 1927-34<sup>2</sup>

Year	All causes	Natal and prenatal causes	All other causes
TOTAL			
1927	41.1	35.9	5.2
1928	45.1	38.4	6.7
1929	60.4	51.4	9.0
1930	55.5	47.5	8.0
1931	49.1	39.0	10.2
1932	55.8	49.1	6.7
1933	71.2	53.1	18.2
1934	68.7	46.1	22.6
WHITE			
1927	35.9	32.3	3.6
1928	38.7	33.7	5.1
1929	49.5	43.3	6.2
1930	51.2	45.1	6.1
1931	40.6	33.3	7.3
1932	42.6	38.6	3.9
1933	62.0	47.9	14.1
1934	57.2	41.7	15.5
COLORED			
1927	49.8	42.0	7.8
1928	56.6	46.8	9.8
1929	80.7	66.5	14.2
1930	62.9	51.8	11.1
1931	64.4	49.0	15.4
1932	76.3	65.3	11.1
1933	85.6	61.2	24.5
1934	86.2	52.7	33.5

<sup>1</sup> Deaths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.TABLE 4.—Mortality in the second to the twelfth month of life<sup>1</sup> from specified groups of causes; Memphis, Tenn., 1927-34<sup>2</sup>

Year	All causes	Natal and prenatal causes	Respiratory diseases	Gastro-intestinal diseases	Epidemic and communicable diseases	All other and unknown or ill-defined diseases
TOTAL						
1927	41.0	6.1	14.4	8.0	6.4	6.1
1928	46.8	9.0	16.3	8.8	3.4	9.2
1929	37.2	5.5	13.7	5.3	5.0	7.7
1930	49.2	9.5	15.1	8.2	6.0	10.4
1931	55.9	8.9	16.7	11.4	8.5	10.5
1932	42.6	12.0	11.0	7.4	4.4	7.9
1933	43.2	9.0	11.8	6.9	3.1	12.4
1934	46.9	8.9	13.1	11.7	4.0	9.4
WHITE						
1927	29.0	4.1	7.2	6.8	5.3	5.6
1928	29.7	5.6	8.3	5.6	3.4	6.8
1929	24.8	4.7	8.4	2.9	5.1	3.6
1930	31.2	6.4	6.8	8.1	2.7	7.2
1931	44.0	4.5	13.1	10.0	8.3	8.2
1932	35.1	9.0	6.4	9.0	3.7	7.1
1933	33.1	7.5	5.0	6.3	2.5	11.7
1934	37.4	6.1	8.0	12.6	3.1	7.7
COLORED						
1927	61.2	9.5	26.5	10.1	8.2	6.9
1928	77.9	15.2	31.0	14.5	3.4	13.8
1929	61.1	7.0	23.9	9.8	4.9	15.4
1930	80.8	14.8	29.7	8.3	11.9	16.0
1931	77.7	17.0	23.4	13.9	8.8	14.5
1932	54.5	16.8	18.6	4.8	5.4	9.0
1933	59.5	11.4	22.7	8.0	4.0	13.4
1934	61.9	13.2	21.0	10.2	5.4	12.0

<sup>1</sup> Deaths per 1,000 infants surviving the first month of life.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.



TABLE 5.—*Infant mortality*<sup>1</sup> *from specified groups of causes; Memphis, Tenn., 1927-34*<sup>2</sup>

Cause of death	1927	1928	1929	1930	1931	1932	1933	1934
<b>Total</b> .....	<b>80.5</b>	<b>89.8</b>	<b>95.3</b>	<b>102.0</b>	<b>102.3</b>	<b>96.0</b>	<b>111.4</b>	<b>112.4</b>
Natal and prenatal causes.....	41.8	47.0	56.6	56.5	47.4	60.4	61.4	54.3
Respiratory diseases.....	14.9	18.1	14.6	17.1	19.1	11.7	15.5	23.0
Gastrointestinal diseases.....	8.1	9.1	5.4	8.8	12.1	7.6	10.8	16.5
Epidemic and communicable diseases.....	6.3	3.7	5.2	5.9	8.3	4.3	3.3	3.7
External causes.....	0.9	1.6	1.6	1.6	1.5	0.9	1.7	1.3
All other causes.....	4.7	6.5	8.8	6.1	7.6	7.2	11.7	9.1
Unknown or ill-defined diseases.....	3.6	3.7	3.2	5.9	6.4	3.9	6.9	4.3
<b>White</b> .....	<b>63.9</b>	<b>67.3</b>	<b>73.0</b>	<b>80.8</b>	<b>82.9</b>	<b>76.2</b>	<b>93.0</b>	<b>92.5</b>
Natal and prenatal causes.....	36.3	39.1	47.8	51.2	37.6	47.2	54.9	47.5
Respiratory diseases.....	7.6	10.1	8.3	8.7	15.8	6.8	7.5	14.8
Gastrointestinal diseases.....	6.5	6.5	2.8	8.7	10.6	8.9	11.0	16.2
Epidemic and communicable diseases.....	5.4	4.0	5.2	2.6	7.9	3.9	2.4	2.9
External causes.....	1.1	0.4	0.7	0.6	1.7	1.1	2.4	0.7
All other causes.....	4.4	5.8	7.6	6.8	7.3	7.2	10.6	8.3
Unknown or ill-defined diseases.....	2.5	1.4	0.7	2.3	2.0	1.1	4.3	2.2
<b>Colored</b> .....	<b>107.9</b>	<b>130.1</b>	<b>137.0</b>	<b>138.6</b>	<b>137.0</b>	<b>126.7</b>	<b>140.1</b>	<b>142.7</b>
Natal and prenatal causes.....	51.0	61.2	73.0	65.7	65.0	80.8	71.6	64.8
Respiratory diseases.....	27.0	32.5	26.5	31.7	24.8	19.4	28.1	35.7
Gastrointestinal diseases.....	10.8	13.7	10.3	8.9	14.8	5.5	10.4	17.0
Epidemic and communicable diseases.....	7.8	3.3	5.2	11.7	8.9	5.0	4.9	4.9
External causes.....	0.6	3.9	3.2	3.3	1.2	0.6	0.6	2.2
All other causes.....	5.4	7.8	11.0	5.0	8.3	7.2	13.5	10.4
Unknown or ill-defined diseases.....	5.4	7.8	7.8	12.2	14.2	8.3	11.0	7.7

<sup>1</sup> Deaths in the first year of life per 1,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.TABLE 6.—*Infant mortality*<sup>1</sup> *in cities with 250,000 to 350,000 population and by color for cities with 25,000 or more colored population, 1927-34*<sup>2</sup>

City	1927	1928	1929	1930	1931	1932	1933	1934
Akron, Ohio.....	62	69	64	55	54	46	47	48
Atlanta, Ga. <sup>3</sup> .....		100	94	94	84	69	83	83
White.....		71	75	65	65	56	64	71
Colored.....		156	128	148	121	92	113	104
Birmingham, Ala.....	78	95	88	78	65	65	71	77
White.....	58	74	65	55	53	49	56	62
Colored.....	111	127	124	111	86	87	88	97
Columbus, Ohio.....	64	73	71	71	61	61	69	58
White.....	59	69	65	67	61	59	61	55
Colored.....	97	100	123	100	66	74	126	78
Dallas, Tex. <sup>4</sup> .....							86	71
White.....							79	62
Colored.....							114	103
Denver, Colo. <sup>3</sup> .....		91	84	93	70	69	55	63
Houston, Tex. <sup>4</sup> .....							61	68
White.....							45	45
Colored.....							105	125
Jersey City, N. J.....	63	85	67	72	74	54	41	45
Louisville, Ky.....	66	81	72	67	77	67	66	61
White.....	64	75	66	63	67	61	60	78
Colored.....	80	129	108	96	144	102	98	91
Memphis, Tenn.....	80	90	95	102	102	96	111	112
White.....	64	67	73	81	83	76	93	92
Colored.....	108	130	137	139	137	127	140	143
Oakland, Calif.....	53	47	47	47	41	40	38	40
Portland, Oreg.....	47	43	43	41	36	34	38	36
Providence, R. I.....	63	63	66	53	59	60	55	50
Rochester, N. Y.....	63	61	63	51	54	48	51	42
St. Paul, Minn.....	49	54	46	43	44	39	46	43
Toledo, Ohio.....	62	65	70	56	56	62	59	53

<sup>1</sup> Deaths in the first year of life per 1,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.<sup>3</sup> Colorado and Georgia were admitted to the birth-registration area in 1928.<sup>4</sup> Texas was admitted to the birth-registration area in 1933.

TABLE 7.—Mortality in the first month of life<sup>1</sup> in cities with 250,000 to 350,000 population and by color for cities with 25,000 or more colored population, 1927-34<sup>2</sup>

City	1927	1928	1929	1930	1931	1932	1933	1934
Akron, Ohio	38.0	38.6	38.7	35.5	34.1	27.8	34.2	29.0
Atlanta, Ga. <sup>3</sup>		57.9	54.1	52.8	51.0	44.2	51.5	47.1
White		44.8	43.8	40.7	43.1	36.9	41.9	42.2
Colored		83.4	72.8	76.3	66.5	57.0	67.3	56.0
Birmingham, Ala.	45.5	52.3	48.9	47.5	42.3	41.4	45.2	48.6
White	37.3	44.0	45.2	32.9	37.3	33.1	38.7	40.4
Colored	58.9	64.8	54.5	68.4	50.7	53.1	53.3	59.7
Columbus, Ohio	37.3	41.8	41.1	40.6	33.8	34.6	45.8	32.7
Dallas, Tex. <sup>4</sup>							42.9	38.5
White							39.3	34.3
Colored							55.6	52.2
Denver, Colo. <sup>3</sup>		49.8	44.4	43.8	38.6	36.0	33.6	34.7
Houston, Tex. <sup>4</sup>							34.2	40.4
White							27.1	30.8
Colored							53.0	63.9
Jersey City, N. J.	32.7	38.4	34.9	37.9	42.2	28.0	23.4	27.0
Louisville, Ky.	36.7	42.4	33.5	36.6	39.3	41.4	37.0	37.6
White	36.6	40.3	32.3	35.0	33.1	36.4	31.8	36.9
Colored	37.5	57.3	42.0	48.1	78.1	71.3	67.3	42.0
Memphis, Tenn.	41.1	45.1	60.4	55.5	49.1	55.8	71.2	68.7
White	35.9	38.7	49.5	51.2	40.6	42.6	62.0	57.2
Colored	49.8	56.6	80.7	62.9	64.4	76.3	85.6	86.2
Oakland, Calif.	30.0	29.5	28.6	26.9	26.0	27.8	22.0	27.6
Portland, Oreg.	29.2	29.2	25.2	29.4	24.9	22.3	28.2	24.3
Providence, R. I.	38.0	32.0	41.0	32.8	38.6	36.3	37.5	34.4
Rochester, N. Y.	38.3	35.4	40.0	34.1	33.9	31.0	34.6	32.9
St. Paul, Minn.	30.1	35.6	31.0	29.1	29.4	26.4	32.1	28.9
Toledo, Ohio	39.6	41.6	43.5	35.1	34.4	41.8	41.1	32.9

<sup>1</sup> Deaths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.<sup>3</sup> Colorado and Georgia were admitted to the birth-registration area in 1928.<sup>4</sup> Texas was admitted to the birth-registration area in 1933.TABLE 8.—Mortality in the second to the twelfth month of life<sup>1</sup> in cities with 250,000 to 350,000 population and by color for cities with 25,000 or more colored population, 1927-34<sup>2</sup>

City	1927	1928	1929	1930	1931	1932	1933	1934
Akron, Ohio	24.8	31.3	26.3	20.5	20.1	18.6	13.5	19.2
Atlanta, Ga. <sup>3</sup>		44.3	41.7	43.0	34.6	26.3	32.9	37.5
White		27.1	32.1	25.7	23.1	20.2	23.5	30.1
Colored		79.4	59.5	77.8	57.9	37.2	48.6	51.3
Birmingham, Ala.	34.2	45.0	41.5	31.7	24.2	24.6	26.5	30.2
White	21.3	30.9	21.0	22.6	16.8	16.7	18.5	22.9
Colored	55.7	66.9	73.5	45.3	36.9	36.0	36.8	40.2
Columbus, Ohio	27.3	32.1	31.7	31.4	28.7	26.8	24.6	26.1
Dallas, Tex. <sup>4</sup>							45.4	34.2
White							40.9	28.3
Colored							61.8	54.1
Denver, Colo. <sup>3</sup>		43.1	41.4	51.0	32.4	34.4	21.7	29.7
Houston, Tex. <sup>4</sup>							28.2	28.9
White							18.3	14.7
Colored							55.2	65.0
Jersey City, N. J.	31.8	48.2	33.4	35.0	32.8	26.8	18.3	18.5
Louisville, Ky.	30.4	40.7	39.3	31.7	39.6	26.8	29.8	34.7
White	28.3	35.8	34.9	29.0	34.7	25.9	29.2	32.2
Colored	44.0	76.3	69.1	50.6	71.5	32.7	33.2	51.4
Memphis, Tenn.	41.0	46.8	37.2	49.2	55.9	42.6	43.2	46.9
White	29.0	29.7	24.8	31.2	44.0	35.1	33.1	37.4
Colored	61.2	77.9	61.1	80.8	77.7	54.5	59.5	61.9
Oakland, Calif.	23.3	18.2	18.6	20.2	15.4	12.7	16.4	13.2
Portland, Oreg.	18.0	13.9	17.8	11.6	10.9	11.7	9.7	11.5
Providence, R. I.	26.2	32.4	25.9	20.5	21.5	24.2	17.7	15.9
Rochester, N. Y.	26.0	26.2	24.0	17.6	20.5	17.8	16.9	9.4
St. Paul, Minn.	19.0	18.6	15.6	14.2	15.2	13.0	14.3	14.3
Toledo, Ohio	23.6	24.8	27.2	21.8	22.6	20.9	18.5	20.5

<sup>1</sup> Deaths per 1,000 infants surviving the first month of life.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.<sup>3</sup> Colorado and Georgia were admitted to the birth-registration area in 1928.<sup>4</sup> Texas was admitted to the birth-registration area in 1933.

TABLE 9.—Mortality in certain periods of the first year of life<sup>1</sup> in 3 cities<sup>2</sup> with 250,000 to 350,000 population and 25,000 or more colored population, 1928-34<sup>3</sup>

Period of life	1928	1929	1930	1931	1932	1933	1934
<b>First year</b> .....	<b>91.5</b>	<b>83.8</b>	<b>79.1</b>	<b>75.6</b>	<b>67.2</b>	<b>73.1</b>	<b>77.2</b>
White.....	73.2	68.2	61.5	62.4	56.5	60.5	67.6
Colored.....	138.2	122.8	122.9	109.4	91.5	99.8	99.5
<b>First month</b> .....	<b>50.5</b>	<b>44.9</b>	<b>45.4</b>	<b>44.2</b>	<b>42.4</b>	<b>44.6</b>	<b>44.3</b>
White.....	42.6	39.1	36.1	37.4	35.7	36.7	39.5
Colored.....	70.5	59.4	68.3	61.6	57.6	61.3	55.5
<b>Second to twelfth month</b> .....	<b>43.2</b>	<b>40.7</b>	<b>35.4</b>	<b>32.9</b>	<b>25.9</b>	<b>29.8</b>	<b>34.3</b>
White.....	32.0	30.3	26.3	26.1	21.6	24.7	29.2
Colored.....	72.9	67.4	58.6	50.9	36.0	41.1	46.5

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Atlanta, Ga., Birmingham, Ala., and Louisville, Ky. (combined).

<sup>3</sup> Compiled from figures supplied by U. S. Bureau of the Census.

TABLE 10.—Infant mortality,<sup>1</sup> by cause, in cities with 250,000 to 350,000 population and 25,000 or more colored population, 1934<sup>2</sup>

City	All causes	Natal and prenatal causes	Respiratory diseases	Gastrointestinal diseases	Epidemic and communicable diseases	All other and unknown or ill-defined diseases
<b>TOTAL</b>						
Memphis, Tenn.—Crude.....	112.4	54.3	23.0	16.5	3.7	14.8
Memphis, Tenn.—Resident.....	89.6	44.3	23.0	8.9	3.5	9.9
Atlanta, Ga.....	82.9	45.7	13.9	8.3	5.1	9.9
Birmingham, Ala.....	77.3	49.8	9.1	4.2	4.0	10.1
Columbus, Ohio.....	58.0	35.5	9.6	4.2	2.5	6.1
Dallas, Tex.....	71.3	41.0	11.2	9.6	2.9	6.7
Houston, Tex.....	68.1	38.2	12.3	8.1	2.0	7.4
Louisville, Ky.....	71.0	35.1	10.8	12.2	4.0	8.9
<b>WHITE</b>						
Memphis, Tenn.—Crude.....	92.5	47.5	14.8	16.2	2.9	11.2
Memphis, Tenn.—Resident.....	64.2	36.7	12.8	6.9	2.8	5.0
Atlanta, Ga.....	71.0	39.4	9.5	8.9	5.0	8.1
Birmingham, Ala.....	62.4	42.9	5.1	4.4	1.8	8.1
Columbus, Ohio.....	55.0	34.7	8.8	3.4	2.7	5.3
Dallas, Tex.....	61.6	37.3	7.8	7.3	2.5	6.8
Houston, Tex.....	45.1	31.6	3.8	4.1	1.8	3.8
Louisville, Ky.....	68.0	34.8	9.0	11.8	3.7	8.7
<b>COLORED</b>						
Memphis, Tenn.—Crude.....	142.7	64.8	35.7	17.0	4.9	20.3
Memphis, Tenn.—Resident.....	120.8	53.6	35.6	11.3	4.5	15.8
Atlanta, Ga.....	104.4	57.1	21.9	7.1	5.1	13.3
Birmingham, Ala.....	97.5	59.2	14.4	4.0	7.0	13.0
Columbus, Ohio.....	77.9	40.6	14.6	9.7	1.6	11.3
Dallas, Tex.....	103.5	53.0	22.4	17.4	4.1	6.6
Houston, Tex.....	124.8	54.5	33.2	18.2	2.5	16.3
Louisville, Ky.....	91.3	37.7	23.2	14.5	5.8	10.1

<sup>1</sup> Deaths in the first year of life per 1,000 live births.

<sup>2</sup> Compiled from figures supplied by the U. S. Bureau of the Census and, for resident, by the Memphis Department of Health.

TABLE 11.—Mortality in the first month of life,<sup>1</sup> by cause, in cities with 250,000 to 350,000 population and 25,000 or more colored population, 1934<sup>2</sup>

City	All causes	Natal and prenatal causes	Respiratory diseases	Gastro-intestinal diseases	Epidemic and communicable diseases	All other and unknown or ill-defined diseases
<b>TOTAL</b>						
Memphis, Tenn.—Crude	68.7	46.1	10.9	5.7		6.0
Memphis, Tenn.—Resident	58.7	38.2	11.6	4.3		4.6
Atlanta, Ga.	47.1	42.2	1.4	.9	0.2	2.4
Birmingham, Ala.	48.6	43.9	1.3		.2	3.2
Columbus, Ohio	32.7	29.3	1.7	.2	.2	1.3
Dallas, Tex.	38.5	34.8	1.2	1.0		1.6
Houston, Tex.	40.4	35.7	2.4	.7		1.6
Louisville, Ky.	37.6	30.8	2.7	1.7	.2	2.3
<b>WHITE</b>						
Memphis, Tenn.—Crude	57.2	41.7	7.2	4.3		4.0
Memphis, Tenn.—Resident	44.5	32.1	6.0	3.2		3.2
Atlanta, Ga.	42.2	37.7	1.4	1.1	.3	1.7
Birmingham, Ala.	40.4	37.4	.4			2.6
Columbus, Ohio	31.3	28.1	1.5	.2	.2	1.2
Dallas, Tex.	34.3	31.6	1.0	.8		1.0
Houston, Tex.	30.8	29.5				1.3
Louisville, Ky.	36.9	31.0	2.0	1.5	.2	2.2
<b>COLORED</b>						
Memphis, Tenn.—Crude	86.2	52.7	16.5	7.7		9.3
Memphis, Tenn.—Resident	76.2	45.7	18.6	5.6		6.2
Atlanta, Ga.	56.0	50.4	1.5	.5		3.6
Birmingham, Ala.	59.7	52.7	2.5		.5	4.0
Columbus, Ohio	42.2	37.3	3.2			1.6
Dallas, Tex.	52.2	45.5	1.7	1.7		3.3
Houston, Tex.	63.9	50.8	8.2	2.5		2.5
Louisville, Ky.	42.0	29.0	7.2	2.9		2.9

<sup>1</sup> Deaths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by the U. S. Bureau of the Census and, for resident, by the Memphis Department of Health.TABLE 12.—Mortality in the second to the twelfth month of life,<sup>1</sup> by cause, in cities with 250,000 to 350,000 population and 25,000 or more colored population, 1934<sup>2</sup>

City	All causes	Natal and prenatal causes	Respiratory diseases	Gastro-intestinal diseases	Epidemic and communicable diseases	All other and unknown or ill-defined diseases
<b>TOTAL</b>						
Memphis, Tenn.—Crude	46.9	8.9	13.1	11.7	4.0	9.3
Memphis, Tenn.—Resident	32.8	6.4	12.1	4.8	3.8	5.6
Atlanta, Ga.	37.5	3.6	13.1	7.8	5.1	8.0
Birmingham, Ala.	30.2	6.2	8.2	4.4	4.0	7.3
Columbus, Ohio	26.1	6.4	8.1	4.2	2.4	5.0
Dallas, Tex.	34.2	6.4	10.4	9.0	3.0	5.4
Houston, Tex.	28.9	2.6	10.4	7.7	2.1	6.1
Louisville, Ky.	34.7	4.5	8.5	10.9	3.9	6.9
<b>WHITE</b>						
Memphis, Tenn.—Crude	37.4	6.1	8.0	12.6	3.1	7.7
Memphis, Tenn.—Resident	20.6	4.8	7.2	3.8	2.9	1.9
Atlanta, Ga.	30.1	1.8	8.5	8.2	5.0	6.7
Birmingham, Ala.	22.9	5.7	5.0	4.6	1.9	5.7
Columbus, Ohio	24.5	6.8	7.6	3.3	2.5	4.3
Dallas, Tex.	28.3	6.0	7.0	6.7	2.6	6.0
Houston, Tex.	14.7	2.1	3.9	4.2	1.8	2.6
Louisville, Ky.	32.2	3.9	7.3	10.7	3.6	6.8
<b>COLORED</b>						
Memphis, Tenn.—Crude	61.9	13.2	21.0	10.2	5.4	12.0
Memphis, Tenn.—Resident	48.3	8.6	18.3	6.1	4.9	10.4
Atlanta, Ga.	51.3	7.0	21.6	7.0	5.4	10.3
Birmingham, Ala.	40.2	6.9	12.7	4.2	6.9	9.5
Columbus, Ohio	37.3	3.4	11.9	10.2	1.7	10.2
Dallas, Tex.	54.1	7.9	21.8	16.6	4.4	3.4
Houston, Tex.	65.0	4.0	26.8	16.7	2.7	14.7
Louisville, Ky.	51.4	9.1	16.6	12.1	6.1	7.6

<sup>1</sup> Deaths per 1,000 infants surviving the first month of life.<sup>2</sup> Compiled from figures supplied by the U. S. Bureau of the Census and, for resident, by the Memphis Department of Health.

TABLE 13.—Mortality, by cause, in certain periods of the first year of life<sup>1</sup> among all infants born in Memphis and among infants born to resident mothers, 1934<sup>2</sup>

Period of life	All causes	Natal and prenatal causes	Respiratory diseases	Gastro-intestinal diseases	Epidemic and communicable diseases	All other and unknown or ill-defined diseases
<b>TOTAL</b>						
First year.....	112.4	54.3	23.0	16.5	3.7	14.8
Mother resident.....	89.6	44.3	23.0	8.9	3.5	9.9
First month.....	68.7	46.1	10.9	5.7	-----	6.6
Mother resident.....	58.7	38.2	11.6	4.3	-----	4.6
Second to twelfth month.....	46.9	8.9	13.1	11.7	4.0	9.3
Mother resident.....	32.8	6.4	12.1	4.8	3.8	5.6
<b>WHITE</b>						
First year.....	92.5	47.5	14.8	16.2	2.9	11.2
Mother resident.....	64.2	36.7	12.8	6.9	2.8	5.0
First month.....	57.2	41.7	7.2	4.3	-----	4.0
Mother resident.....	44.5	32.1	6.0	3.2	-----	3.2
Second to twelfth month.....	37.4	5.1	8.0	12.6	3.1	7.7
Mother resident.....	20.6	4.8	7.2	3.8	2.9	1.9
<b>COLORED</b>						
First year.....	142.7	64.8	35.7	17.0	4.9	20.3
Mother resident.....	120.8	53.6	35.6	11.3	4.5	15.8
First month.....	86.2	52.7	16.5	7.7	-----	9.3
Mother resident.....	76.2	45.7	18.6	5.6	-----	6.2
Second to twelfth month.....	61.9	13.2	21.0	10.2	5.4	12.0
Mother resident.....	48.3	8.6	18.3	6.1	4.9	10.4

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Compiled from figures supplied by the U. S. Bureau of the Census and, for resident, by the Memphis Department of Health.



TABLE 14.—Number of deaths, by cause, in certain periods of the first year of life among infants whose mothers were resident and infants whose mothers were non-resident in Memphis, Tenn., 1934<sup>1</sup>

Cause of death	Deaths in first year						Deaths in second to twelfth month					
	Deaths in first year			Deaths in first month			Deaths in first year			Deaths in second to twelfth month		
	Mother resident		Mother nonresident	Mother resident		Mother nonresident	Mother resident		Mother nonresident	Mother resident		Mother nonresident
	Number	Percent <sup>2</sup>	Number	Percent <sup>2</sup>	Number	Percent <sup>2</sup>	Number	Percent <sup>2</sup>	Number	Percent <sup>2</sup>	Number	Percent <sup>2</sup>
<b>Total</b> .....	<b>517</b>		<b>163</b>	<b>31.5</b>	<b>316</b>		<b>84</b>	<b>26.6</b>	<b>201</b>		<b>79</b>	<b>39.3</b>
Natal and prenatal causes.....	263		88	33.5	214		63	29.4	49		25	
Respiratory diseases.....	113		22	19.5	55		9	16.4	58		13	
Gastrointestinal diseases.....	63		28	44.4	21		4		42		24	
Epidemic and communicable diseases.....	22		8		1		1		21		7	
All other and unknown or ill-defined diseases.....	56		17	30.4	25		7		31		10	
<b>White</b> .....	<b>258</b>		<b>118</b>	<b>45.7</b>	<b>160</b>		<b>63</b>	<b>39.4</b>	<b>98</b>		<b>55</b>	<b>56.1</b>
Natal and prenatal causes.....	141		61	43.3	117		47	40.2	24		14	
Respiratory diseases.....	43		15		20		7		23		8	
Gastrointestinal diseases.....	40		25		11		4		29		21	
Epidemic and communicable diseases.....	12		6		1		1		11		5	
All other and unknown or ill-defined diseases.....	22		11		11		4		11		7	
<b>Colored</b> .....	<b>259</b>		<b>45</b>	<b>17.4</b>	<b>156</b>		<b>21</b>	<b>13.5</b>	<b>103</b>		<b>24</b>	<b>23.3</b>
Natal and prenatal causes.....	122		27	22.1	97		16	16.5	25		11	
Respiratory diseases.....	70		7	10.0	35		2		35		5	
Gastrointestinal diseases.....	23		3		10		3		13		3	
Epidemic and communicable diseases.....	10		2				2		10		2	
All other and unknown or ill-defined diseases.....	34		6		14		3		20		3	

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.

<sup>2</sup> Percent not shown when number of deaths was less than 50.

TABLE 15.—Mortality in certain periods of the first month of life<sup>1</sup> among infants born to resident mothers; Memphis, Tenn., 1934<sup>2</sup>

Color	First month	First week			Second week to first month
		Total	First day	Second to sixth day	
Total.....	58.7	32.4	18.7	13.7	26.3
White.....	44.5	27.5	17.9	9.6	17.0
Colored.....	76.2	38.4	19.8	18.6	37.8

<sup>1</sup> Deaths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by the Memphis Department of Health; rates based on figures corrected after inquiry of deaths.TABLE 16.—Mortality in certain periods of the first year of life<sup>1</sup> as shown by crude and resident mortality rates; Memphis, Tenn., 1930-32 and 1934

Period of life	1930-32		1934	
	Crude rate <sup>2</sup>	Resident rate <sup>3</sup>	Crude rate <sup>2</sup>	Resident rate (as originally certified) <sup>3</sup>
<b>First year</b> .....	<b>100.2</b>	<b>90.2</b>	<b>112.4</b>	<b>95.9</b>
White.....	80.1	63.7	92.5	70.2
Colored.....	134.0	127.6	142.7	127.6
<b>First month</b> .....	<b>53.5</b>	<b>51.5</b>	<b>68.7</b>	<b>64.3</b>
White.....	44.9	40.4	57.2	49.7
Colored.....	68.0	67.1	86.2	82.3
<b>Second to twelfth month</b> .....	<b>49.3</b>	<b>40.8</b>	<b>46.9</b>	<b>33.8</b>
White.....	36.8	24.3	37.4	21.6
Colored.....	70.9	64.9	61.9	49.4

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.<sup>3</sup> Compiled from figures supplied by the Memphis Department of Health; the rate based on birth and death records as originally certified is used for 1934 to make the figures comparable with those for 1930-32.

TABLE 17.—Place of birth of infants dying in certain periods of the first year of life in Memphis, Tenn., 1930-34<sup>1</sup>

Year	Infants dying in first year of life																	
	Total						In first month						In second to twelfth month					
	Born in city			Born elsewhere			Total		Born in city		Born elsewhere		Total		Born in city		Born elsewhere	
	Number	Percent		Number	Percent		Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
	TOTAL																	
1930.....	491	93	34	7	265	259	98	6	2	226	198	88	28	12				
1931.....	484	86	68	14	233	226	97	7	3	190	190	76	61	24				
1932.....	441	85	66	15	257	245	95	12	5	184	130	71	54	29				
1933.....	466	87	62	13	300	290	97	10	3	166	114	69	52	31				
1934.....	517	83	89	17	316	301	95	15	5	201	127	63	74	37				
	WHITE																	
1930.....	245	87	32	13	155	149	96	6	4	90	64	71	26	29				
1931.....	250	77	57	23	125	119	95	6	5	125	74	59	51	41				
1932.....	215	162	51	24	119	109	92	10	8	94	53	56	41	44				
1933.....	237	194	82	34	159	151	95	8	5	78	43	55	35	45				
1934.....	258	194	75	25	160	148	93	12	8	98	46	47	52	53				
	COLORED																	
1930.....	246	99	2	1	110	110	100	1	1	136	134	99	2	1				
1931.....	234	95	11	5	108	107	99	1	1	126	116	92	10	8				
1932.....	228	213	93	7	138	136	99	2	2	90	77	86	13	14				
1933.....	229	210	92	8	141	139	99	2	1	103	71	81	17	19				
1934.....	259	234	90	10	156	153	98	3	2	103	81	79	22	21				

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health. For corresponding figures for Birmingham, Ala., see table 40, p. 102.

TABLE 18.—Mortality in certain periods of the first year of life<sup>1</sup> among all infants dying in the city and among infants born in Memphis, Tenn., 1930-34<sup>2</sup>

Year	Total		White		Colored	
	Total	Born in city	Total	Born in city	Total	Born in city
FIRST YEAR						
1930.....	100.2	93.3	78.8	68.5	137.3	136.2
1931.....	101.7	87.4	82.1	63.4	136.4	130.0
1932.....	95.5	81.2	76.0	57.8	125.8	117.5
1933.....	109.7	95.1	91.8	75.2	137.3	125.9
1934.....	111.9	92.6	92.4	69.5	141.8	128.1
FIRST MONTH						
1930.....	54.1	52.9	49.9	47.9	61.4	61.4
1931.....	48.9	47.5	41.1	39.1	62.9	62.4
1932.....	55.7	53.1	42.4	38.9	76.2	75.1
1933.....	70.6	68.3	61.6	58.5	84.5	83.3
1934.....	68.4	65.2	57.3	53.0	85.4	83.7
SECOND TO TWELFTH MONTH						
1930.....	48.8	42.7	30.5	21.7	80.9	79.7
1931.....	55.4	42.0	42.8	25.3	78.4	72.1
1932.....	42.2	29.8	35.0	19.7	53.8	46.0
1933.....	42.0	28.9	32.2	17.8	57.6	46.5
1934.....	46.7	29.5	37.2	17.5	61.6	48.5

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Compiled from figures supplied by the Memphis Department of Health. For corresponding figures for Birmingham, Ala., see table 41, p. 103.

TABLE 19.—Live births to resident and nonresident mothers; Memphis, Tenn., 1927-34<sup>1</sup>

Year	Live births				
	Total	To resident mothers		To nonresident mothers	
		Number	Percent	Number	Percent
TOTAL					
1927.....	4,384	3,736	85	648	15
1928.....	4,332	3,751	87	581	13
1929.....	4,466	3,730	84	736	16
1930.....	4,900	4,405	90	495	10
1931.....	4,761	4,206	88	555	12
1932.....	4,616	4,105	89	511	11
1933.....	4,249	3,721	88	528	12
1934.....	4,620	3,953	86	667	14
WHITE					
1927.....	2,743	2,174	79	569	21
1928.....	2,778	2,277	82	501	18
1929.....	2,913	2,288	79	625	21
1930.....	3,108	2,622	84	486	16
1931.....	3,045	2,508	82	537	18
1932.....	2,804	2,327	83	477	17
1933.....	2,581	2,089	81	492	19
1934.....	2,793	2,181	78	612	22
COLORED					
1927.....	1,641	1,562	95	79	5
1928.....	1,554	1,474	95	80	5
1929.....	1,553	1,442	93	111	7
1930.....	1,792	1,783	99	9	1
1931.....	1,716	1,698	99	18	1
1932.....	1,812	1,778	98	34	2
1933.....	1,668	1,632	98	36	2
1934.....	1,827	1,772	97	55	3

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.

TABLE 20.—*Proportion of births in hospitals; Memphis, Tenn., 1927-34*<sup>1</sup>

Year	Live births and stillbirths				
	Total	In hospitals		In homes	
		Number	Percent	Number	Percent
<b>TOTAL</b>					
1927.....	4,659	2,664	57	1,995	43
1928.....	4,589	2,650	58	1,939	42
1929.....	4,736	2,923	62	1,813	38
1930.....	5,157	2,960	57	2,197	43
1931.....	5,007	3,058	61	1,949	39
1932.....	4,831	3,026	63	1,805	37
1933.....	4,466	2,803	63	1,663	37
1934.....	4,821	3,060	63	1,761	37
<b>WHITE</b>					
1927.....	2,855	1,873	66	982	34
1928.....	2,876	1,900	66	976	34
1929.....	3,034	2,209	73	825	27
1930.....	3,212	2,309	72	903	28
1931.....	3,140	2,372	76	768	24
1932.....	2,896	2,211	76	685	24
1933.....	2,690	2,042	76	648	24
1934.....	2,873	2,284	79	589	21
<b>COLORED</b>					
1927.....	1,804	791	44	1,013	56
1928.....	1,713	750	44	963	56
1929.....	1,702	714	42	988	58
1930.....	1,945	651	33	1,294	67
1931.....	1,867	686	37	1,181	63
1932.....	1,935	815	42	1,120	58
1933.....	1,776	761	43	1,015	57
1934.....	1,948	776	40	1,172	60

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.

TABLE 21.—*Mortality in certain periods of the first year of life*<sup>1</sup> *among infants born to residents of entire city, of old city, and of annexed territory; Memphis, Tenn., 1930-32*<sup>2</sup>

Period of life	Entire city	Old city	Annexed territory
<b>TOTAL</b>			
First year.....	90.2	82.5	111.1
First month.....	51.5	49.1	57.8
<b>WHITE</b>			
First year.....	63.7	60.9	71.9
First month.....	40.4	40.2	40.8
<b>COLORED</b>			
First year.....	127.6	115.0	157.3
First month.....	67.1	62.5	78.0

<sup>1</sup> Deaths per 1,000 live births.

<sup>2</sup> Compiled from figures supplied by the Memphis Department of Health.



TABLE 22.—Average monthly number of cases receiving general public relief and average monthly relief per case during 1934 in Memphis and certain other urban areas included in the Children's Bureau summary of monthly relief trends

State and urban area	Area included	Average monthly number of cases		Average monthly relief per case
		Number	Per 10,000 population	
Akron, Ohio.....	County.....	12,994		
Atlanta, Ga.....	Area.....	22,403	462.0	\$21.12
Birmingham, Ala.....	County.....	27,274	652.5	17.73
Columbus, Ohio.....	do.....	15,599	632.1	12.87
Dallas, Tex.....	do.....	11,380	432.0	19.95
Denver, Colo.....	do.....	14,103	549.4	13.38
Houston, Tex.....	do.....	13,362	489.9	26.00
Jersey City, N. J.....	City.....	11,385	371.9	13.34
Louisville, Ky.....	do.....	3,381	359.5	26.24
Memphis, Tenn.....	County.....	6,904	109.9	20.65
Oakland, Calif.....	do.....	12,258	225.3	15.53
Portland, Oreg.....	do.....	17,667	431.5	25.50
Providence, R. I.....	City.....	6,166	522.3	22.54
Rochester, N. Y.....	do.....	13,192	243.7	31.91
St. Paul, Minn.....	County.....	13,679	402.0	38.60
Toledo, Ohio.....	do.....	23,649	477.1	28.87
			813.5	18.63

TABLE 23.—Place of birth and attendant at birth of infants born alive in Memphis, Tenn., 1930-34<sup>1</sup>

Place of birth and attendant at birth	Live births									
	1930		1931		1932		1933		1934	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
<b>Total.....</b>	<b>4,900</b>	<b>100</b>	<b>4,761</b>	<b>100</b>	<b>4,616</b>	<b>100</b>	<b>4,249</b>	<b>100</b>	<b>4,620</b>	<b>100</b>
Hospital.....	2,814	57	2,916	61	2,877	62	2,661	63	2,931	63
Memphis General.....	868	18	977	21	1,172	25	1,088	26	1,069	23
Other hospitals.....	1,946	40	1,939	41	1,705	37	1,573	37	1,862	40
Home.....	2,086	43	1,845	39	1,739	38	1,588	37	1,689	37
Physicians.....	1,922	39	1,751	37	1,663	36	1,542	36	1,638	35
White.....	1,578	32	1,440	30	1,435	31	1,343	32	1,421	31
Memphis General.....	725	15	737	15	876	19	855	20	1,029	22
Other physicians.....	853	17	703	15	559	12	488	11	392	8
Colored.....	344	7	311	7	228	5	199	5	217	5
Midwives.....	164	3	94	2	76	2	46	1	51	1
<b>White.....</b>	<b>3,108</b>	<b>100</b>	<b>3,045</b>	<b>100</b>	<b>2,804</b>	<b>100</b>	<b>2,581</b>	<b>100</b>	<b>2,793</b>	<b>100</b>
Hospital.....	2,224	72	2,294	75	2,138	76	1,956	76	2,215	79
Memphis General.....	282	9	359	12	438	16	388	15	359	13
Other hospitals.....	1,942	62	1,935	64	1,700	61	1,568	61	1,856	66
Home.....	884	28	751	25	666	24	625	24	578	21
Physicians (white).....	873	28	740	24	657	23	621	24	575	21
Memphis General.....	81	3	98	3	147	5	198	8	227	8
Other physicians.....	792	25	642	21	510	18	423	16	348	12
Midwives.....	11	( <sup>2</sup> )	11	( <sup>2</sup> )	9	( <sup>2</sup> )	4	( <sup>2</sup> )	3	( <sup>2</sup> )
<b>Colored.....</b>	<b>1,792</b>	<b>100</b>	<b>1,716</b>	<b>100</b>	<b>1,812</b>	<b>100</b>	<b>1,668</b>	<b>100</b>	<b>1,827</b>	<b>100</b>
Hospital.....	590	33	622	36	739	41	705	42	716	39
Memphis General.....	586	33	618	36	734	41	700	42	710	39
Other hospitals.....	4	( <sup>2</sup> )	4	( <sup>2</sup> )	5	( <sup>2</sup> )	5	( <sup>2</sup> )	6	( <sup>2</sup> )
Home.....	1,202	67	1,094	64	1,073	59	963	58	1,111	61
Physicians.....	1,049	59	1,011	59	1,006	56	921	55	1,063	58
White.....	705	39	700	41	778	43	722	43	846	46
Memphis General.....	644	36	639	37	729	40	657	39	802	44
Other physicians.....	61	3	61	4	49	3	65	4	44	2
Colored.....	344	19	311	18	228	13	199	12	217	12
Midwives.....	153	9	83	5	67	4	42	3	48	3

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health and annual reports of the Memphis General Hospital obstetric service.

<sup>2</sup> Less than 1 percent.

TABLE 24.—Percentage of deaths in the first month of life, by place of death; Memphis, Tenn., 1933-34<sup>1</sup>

Place of death	Deaths in first month					
	Total		White		Colored	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
Total.....	616	100	319	100	297	100
Hospital.....	543	88	294	92	249	84
Memphis General.....	368	60	120	38	248	84
Other hospitals.....	175	28	174	55	1	( <sup>2</sup> )
Home.....	73	12	25	8	48	16

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.<sup>2</sup> Less than 1 percent.TABLE 25.—Mortality in certain periods of the first month of life<sup>1</sup> by place of death; Memphis, Tenn., 1933-34<sup>2</sup>

Place of death	First month				
	Total	First week			Second week to first month
		Total	First day	Second to sixth day	
<b>Total.....</b>	<b>69.5</b>	<b>39.4</b>	<b>23.8</b>	<b>15.6</b>	<b>30.1</b>
Hospital.....	97.1	55.3	33.8	21.5	41.8
Memphis General.....	170.6	83.0	50.1	32.9	87.6
Other hospitals.....	50.9	37.8	23.6	14.3	13.1
Home.....	22.3	12.2	6.7	5.5	10.1
<b>White.....</b>	<b>59.4</b>	<b>38.9</b>	<b>24.4</b>	<b>14.5</b>	<b>20.5</b>
Hospital.....	70.5	46.0	28.5	17.5	24.5
Memphis General.....	160.6	84.3	52.2	32.1	76.3
Other hospitals.....	50.8	37.7	23.4	14.3	13.1
Home.....	20.8	14.1	10.0	4.2	6.7
<b>Colored.....</b>	<b>85.0</b>	<b>40.1</b>	<b>22.9</b>	<b>17.2</b>	<b>44.9</b>
Hospital.....	175.2	82.3	49.3	33.1	92.9
Memphis General.....	175.9	82.3	48.9	33.3	93.6
Other hospitals.....	( <sup>3</sup> )	( <sup>3</sup> )	( <sup>2</sup> )	( <sup>3</sup> )	( <sup>3</sup> )
Home.....	23.1	11.1	4.8	6.3	12.1

<sup>1</sup> Deaths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by the Memphis Department of Health.<sup>3</sup> Rate not shown because number of live births was less than 100.

TABLE 26.—Percentage of live births in Memphis attended by physicians of the Memphis General Hospital obstetric service, 1930-34<sup>1</sup>

Year	Live births						
	Total	Attended by Memphis General Hospital obstetric service					
		Total		In hospital		In home	
		Number	Percent	Number	Percent	Number	Percent
<b>TOTAL</b>							
1930.....	4,900	1,593	33	868	18	725	15
1931.....	4,761	1,714	36	977	21	737	15
1932.....	4,616	2,048	44	1,172	25	876	19
1933.....	4,249	1,943	46	1,088	26	855	20
1934.....	4,620	2,098	45	1,069	23	1,029	22
<b>WHITE</b>							
1930.....	3,108	363	12	282	9	81	3
1931.....	3,045	457	15	359	12	98	3
1932.....	2,804	585	21	438	16	147	5
1933.....	2,581	586	23	388	15	198	8
1934.....	2,793	586	21	359	13	227	8
<b>COLORED</b>							
1930.....	1,792	1,230	69	586	33	644	36
1931.....	1,716	1,257	73	618	36	639	37
1932.....	1,812	1,463	81	734	41	729	40
1933.....	1,668	1,357	81	700	42	657	39
1934.....	1,827	1,512	83	710	39	802	44

<sup>1</sup> Compiled from annual reports of the Memphis General Hospital obstetric service.TABLE 27.—Deliveries in hospital and in home by Memphis General Hospital obstetric service and registration at prenatal clinic, 1930-34<sup>1</sup>

Year	All deliveries					Hospital deliveries					Home deliveries <sup>2</sup>
	Total	Registered at clinic		Not registered at clinic		Total	Registered at clinic		Not registered at clinic		
		Number	Percent	Number	Percent		Number	Percent	Number	Percent	
<b>TOTAL</b>											
1930.....	1,704	1,497	88	207	12	947	740	78	207	22	757
1931.....	1,795	1,581	88	214	12	1,041	827	79	214	21	754
1932.....	2,155	1,895	88	260	12	1,263	1,003	79	260	21	892
1933.....	2,041	1,797	88	244	12	1,167	923	79	244	21	874
1934.....	2,245	2,029	90	216	10	1,197	981	82	216	18	1,048
<b>WHITE</b>											
1930.....	375	284	76	91	24	275	184	67	91	33	100
1931.....	467	365	78	102	22	353	251	71	102	29	114
1932.....	597	466	78	131	22	448	317	71	131	29	149
1933.....	597	467	78	130	22	399	269	67	130	33	198
1934.....	620	522	84	98	16	392	294	75	98	25	228
<b>COLORED</b>											
1930.....	1,329	1,213	91	116	9	672	556	83	116	17	657
1931.....	1,328	1,216	92	112	8	688	576	84	112	16	640
1932.....	1,558	1,429	92	129	8	815	686	84	129	16	743
1933.....	1,444	1,330	92	114	8	768	654	85	114	15	676
1934.....	1,625	1,507	93	118	7	805	687	85	118	15	820

<sup>1</sup> Compiled from annual reports of the Memphis General Hospital obstetric service.<sup>2</sup> All registered at clinic.

TABLE 28.—Live births to mothers registered and to mothers not registered at the prenatal clinic of the Memphis General Hospital, 1932-34

Year	Live births				
	Total <sup>1</sup>	To mothers registered at prenatal clinic <sup>2</sup>		To mothers not registered at prenatal clinic	
		Number	Percent	Number	Percent
<b>TOTAL</b>					
1932.....	4,616	1,821	39	2,795	61
1933.....	4,249	1,733	41	2,516	59
1934.....	4,620	1,952	42	2,668	58
<b>WHITE</b>					
1932.....	2,804	460	16	2,344	84
1933.....	2,581	460	18	2,121	82
1934.....	2,793	510	18	2,283	82
<b>COLORED</b>					
1932.....	1,812	1,361	75	451	25
1933.....	1,668	1,273	76	395	24
1934.....	1,827	1,442	79	385	21

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.<sup>2</sup> Compiled from annual reports of the Memphis General Hospital obstetric service.

TABLE 29.—Month of pregnancy in which patient first attended prenatal clinic of Memphis General Hospital, 1926, 1929, and Jan. 1-Apr. 30, 1934

Month of pregnancy of first attendance	Patients registered					
	1926 <sup>1</sup>		1929 <sup>1</sup>		Jan. 1-Apr. 30, 1934 <sup>2</sup>	
	Number	Percent distribution	Number	Percent distribution	Number	Percent distribution
<b>Total</b> .....	<b>858</b>	<b>100</b>	<b>1,394</b>	<b>100</b>	<b>1,712</b>	<b>100</b>
First and second months.....	15	2	67	5	252	15
Third month.....	24	3	82	6	222	13
Fourth month.....	48	6	143	10	303	18
Fifth month.....	77	9	202	14	310	18
Sixth month.....	114	13	297	21	301	18
Seventh month.....	179	21	278	20	200	12
Eighth month.....	202	24	197	14	98	6
Ninth month.....	199	23	128	9	26	2
<b>White</b> .....	<b>220</b>	<b>100</b>	<b>340</b>	<b>100</b>	<b>377</b>	<b>100</b>
First and second months.....	6	3	25	7	35	9
Third month.....	5	2	23	7	56	15
Fourth month.....	11	5	37	11	57	15
Fifth month.....	16	7	41	12	56	15
Sixth month.....	26	12	53	16	66	18
Seventh month.....	43	20	65	19	60	16
Eighth month.....	52	24	50	15	33	9
Ninth month.....	61	28	46	14	14	4
<b>Colored</b> .....	<b>638</b>	<b>100</b>	<b>1,054</b>	<b>100</b>	<b>1,301</b>	<b>100</b>
First and second months.....	9	1	42	4	213	16
Third month.....	19	3	59	6	165	13
Fourth month.....	37	6	106	10	244	19
Fifth month.....	61	10	161	15	251	19
Sixth month.....	88	14	244	23	225	17
Seventh month.....	136	21	213	20	134	10
Eighth month.....	150	24	147	14	58	4
Ninth month.....	138	22	82	8	11	1

<sup>1</sup> Survey of Health Problems and Facilities in Memphis and Shelby County, Tenn., for the Year 1929; made for the committee on administrative practice of the American Public Health Association.<sup>2</sup> Compiled from figures supplied by the prenatal clinic of the Memphis General Hospital.<sup>3</sup> Includes 34 patients for whom color was not reported.

TABLE 30.—Number of patients attending prenatal clinic of Memphis General Hospital, total number of visits, and average number of visits per patient, 1923-34<sup>1</sup>

Year	Patients attending prenatal clinic	Total number of visits to clinic	Average number of visits per patient
1923.....	942	1,940	2.1
1924.....	1,383	3,076	2.2
1925.....	1,535	3,696	2.4
1926.....	1,455	3,919	2.7
1927.....	1,726	4,300	2.5
1928.....	1,695	4,535	2.7
1929.....	1,835	4,705	2.6
1930.....	2,029	5,325	2.6
1931.....	2,165	6,038	2.8
1932.....	2,365	6,777	2.9
1933.....	2,469	7,647	3.1
1934.....	2,755	8,747	3.2

<sup>1</sup> Compiled from figures supplied by the public health nursing division of the Memphis Department of Health.

TABLE 31.—Maternal mortality;<sup>1</sup> Memphis, Tenn., 1927-34<sup>2</sup>

Year	All puerperal causes	Puerperal septicemia	Other puerperal causes
TOTAL			
1927.....	122	66	57
1928.....	165	79	86
1929.....	160	61	99
1930.....	114	43	71
1931.....	108	72	36
1932.....	133	48	85
1933.....	108	55	53
1934.....	139	57	83
WHITE			
1927.....	94	54	40
1928.....	145	80	65
1929.....	152	66	87
1930.....	87	26	61
1931.....	92	79	13
1932.....	111	36	75
1933.....	110	51	59
1934.....	119	54	65
COLORED			
1927.....	168	84	84
1928.....	202	78	124
1929.....	174	52	123
1930.....	161	72	89
1931.....	136	59	77
1932.....	166	66	100
1933.....	104	61	43
1934.....	170	60	110

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.

<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.

TABLE 32.—Maternal mortality;<sup>1</sup> Memphis, Tenn., 1927-30 and 1931-34<sup>2</sup>

Year	All puerperal causes	Puerperal septicemia	Other puerperal causes
TOTAL			
1927-30.....	140	61	78
1931-34.....	122	58	64
WHITE			
1927-30.....	119	56	63
1931-34.....	108	56	52
COLORED			
1927-30.....	176	72	104
1931-34.....	145	62	83

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.

<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.



TABLE 33.—*Maternal mortality*<sup>1</sup> *in cities with 250,000 to 350,000 population and by color for cities with 25,000 or more colored population, 1927-34*<sup>2</sup>

City	1927	1928	1929	1930	1931	1932	1933	1934
Akron, Ohio.....	92	75	90	51	78	63	41	73
Atlanta, Ga. <sup>3</sup> .....		104	96	104	95	92	61	74
White.....		98	103	80	69	78	54	70
Colored.....		118	83	149	148	117	73	82
Birmingham, Ala.....	104	122	144	113	125	107	82	93
White.....	89	108	143	111	81	76	71	77
Colored.....	129	142	146	117	198	151	95	114
Columbus, Ohio.....	98	79	79	106	101	121	99	76
Dallas, Tex. <sup>4</sup> .....							79	75
White.....							58	68
Colored.....							151	99
Denver, Colo. <sup>3</sup> .....		122	96	71	92	101	79	58
Houston, Tex. <sup>4</sup> .....							78	74
White.....							52	59
Colored.....							145	113
Jersey City, N. J.....	49	67	45	63	69	62	41	41
Louisville, Ky.....	54	73	64	77	82	85	74	78
White.....	50	61	64	70	78	84	61	74
Colored.....	85	160	64	124	108	92	148	101
Memphis, Tenn.....	122	165	160	114	108	135	108	139
White.....	94	145	152	87	92	111	110	119
Colored.....	168	202	174	161	136	166	104	170
Oakland, Calif.....	66	64	31	38	57	48	31	47
Portland, Oreg.....	60	52	57	49	37	41	55	63
Providence, R. I.....	76	74	101	75	59	57	62	80
Rochester, N. Y.....	54	86	53	60	39	45	47	48
St. Paul, Minn.....	51	72	50	57	53	60	74	62
Toledo, Ohio.....	90	102	95	86	85	57	86	73

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.<sup>3</sup> Colorado and Georgia were admitted to the birth-registration area in 1928.<sup>4</sup> Texas was admitted to the birth-registration area in 1933.TABLE 34.—*Maternal mortality*<sup>1</sup> *in cities with 250,000 to 350,000 population reporting throughout the period 1931-34*<sup>2</sup>

City	All puerperal causes	Puerperal septicemia	Other puerperal causes
Memphis, Tenn.....	122	58	64
Birmingham, Ala.....	102	42	60
Columbus, Ohio.....	99	47	52
Denver, Colo.....	82	44	38
Atlanta, Ga.....	81	36	45
Louisville, Ky.....	80	39	41
Toledo, Ohio.....	75	36	40
Akron, Ohio.....	65	29	35
Providence, R. I.....	64	29	35
St. Paul, Minn.....	62	33	29
Jersey City, N. J.....	53	24	29
Portland, Oreg.....	49	16	33
Oakland, Calif.....	46	19	27
Rochester, N. Y.....	44	19	26

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.

TABLE 35.—*Maternal mortality*<sup>1</sup> *in cities with 250,000 to 350,000 population and 25,000 or more colored population reporting throughout the period 1931-34*<sup>2</sup>

City	All puerperal causes	Puerperal septicemia	Other puerperal causes
<b>TOTAL</b>			
Memphis, Tenn.....	122	58	64
Birmingham, Ala.....	102	42	60
Atlanta, Ga.....	81	36	45
Louisville, Ky.....	80	39	41
<b>WHITE</b>			
Memphis, Tenn.....	108	56	52
Birmingham, Ala.....	76	31	46
Louisville, Ky.....	74	36	39
Atlanta, Ga.....	68	22	46
<b>COLORED</b>			
Memphis, Tenn.....	145	62	83
Birmingham, Ala.....	139	59	80
Louisville, Ky.....	113	58	55
Atlanta, Ga.....	104	60	43

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.TABLE 36.—*Live births, maternal mortality,*<sup>1</sup> *stillbirth mortality, and premature births among clinic and among nonclinic patients delivered by the Memphis General Hospital obstetric service, 1932-34*<sup>2</sup>

Registration at clinic	Deaths assigned to puerperal causes		Stillbirths		Premature births		Live births
	Number	Rate per 10,000 live births	Number	Rate per 1,000 live births	Number	Rate per 1,000 live births	
<b>Total.....</b>	<b>70</b>	<b>115</b>	<b>230</b>	<b>38</b>	<b>361</b>	<b>59</b>	<b>6,081</b>
Clinic patients.....	26	47	167	30	282	51	5,506
Nonclinic patients.....	44	765	63	110	79	137	575
<b>White.....</b>	<b>18</b>	<b>103</b>	<b>36</b>	<b>21</b>	<b>92</b>	<b>53</b>	<b>1,747</b>
Clinic patients.....	3	21	( <sup>3</sup> )	-----	( <sup>3</sup> )	-----	1,430
Nonclinic patients.....	15	473	( <sup>3</sup> )	-----	( <sup>3</sup> )	-----	317
<b>Colored.....</b>	<b>52</b>	<b>120</b>	<b>194</b>	<b>45</b>	<b>269</b>	<b>62</b>	<b>4,334</b>
Clinic patients.....	23	56	( <sup>3</sup> )	-----	( <sup>3</sup> )	-----	4,076
Nonclinic patients.....	29	1,124	( <sup>3</sup> )	-----	( <sup>3</sup> )	-----	258

<sup>1</sup> Deaths assigned to puerperal causes per 10,000 live births.<sup>2</sup> Compiled from annual reports of the Memphis General Hospital obstetric service.<sup>3</sup> Information not available.

TABLE 37.—Mortality from stillbirths and in the first day of life;<sup>1</sup> Memphis, Tenn., 1927-34<sup>2</sup>

Year	Mortality rates from—		
	Stillbirths and deaths in the first day	Stillbirths	Deaths in first day
<b>TOTAL</b>			
1927.....	88.9	61.9	26.9
1928.....	86.0	58.8	27.2
1929.....	91.7	59.0	32.7
1930.....	83.0	55.1	27.9
1931.....	75.2	48.5	26.7
1932.....	74.3	46.1	28.2
1933.....	76.0	50.9	25.1
1934.....	66.5	43.9	22.6
<b>WHITE</b>			
1927.....	66.4	40.7	25.8
1928.....	57.2	34.7	22.4
1929.....	70.3	40.8	29.4
1930.....	62.5	34.8	27.7
1931.....	55.5	29.4	26.1
1932.....	55.5	32.6	22.9
1933.....	68.3	41.6	26.7
1934.....	51.1	28.8	22.3
<b>COLOR<sup>D</sup></b>			
1927.....	125.9	97.1	28.8
1928.....	137.9	102.1	35.8
1929.....	131.8	93.0	38.8
1930.....	118.5	90.2	28.4
1931.....	110.5	82.7	27.8
1932.....	103.4	66.9	36.5
1933.....	88.1	65.4	22.6
1934.....	90.0	67.0	23.1

<sup>1</sup> Rate per 1,000 live births.<sup>2</sup> Compiled from figures supplied by U. S. Bureau of the Census.TABLE 38.—Stillbirth mortality,<sup>1</sup> by place of birth and attendant at birth; Memphis, Tenn., 1927-34<sup>2</sup>

Place of birth and attendant at birth	1927	1928	1929	1930	1931	1932	1933	1934
<b>Total.....</b>	<b>62.7</b>	<b>59.3</b>	<b>60.5</b>	<b>52.4</b>	<b>51.7</b>	<b>46.6</b>	<b>51.1</b>	<b>43.5</b>
Hospital.....	65.2	66.4	56.4	51.9	48.7	51.8	53.4	44.0
Memphis General.....	81.1	97.9	67.9	80.6	74.7	75.9	62.5	68.3
Other hospitals.....	55.0	47.2	50.4	39.1	35.6	35.2	47.0	30.1
Home.....	59.5	49.8	67.1	53.2	56.4	38.0	47.2	42.6
White physicians.....	39.9	31.2	40.1	32.3	34.7	30.7	43.2	26.7
Colored physicians.....	130.3	138.9	158.1	139.5	147.9	78.9	70.4	152.1
Midwives.....	74.6	53.7	145.0	73.2	(3)	(3)	(3)	(3)
<b>White.....</b>	<b>40.8</b>	<b>35.3</b>	<b>41.5</b>	<b>33.5</b>	<b>31.2</b>	<b>32.8</b>	<b>42.2</b>	<b>28.6</b>
Hospital.....	49.9	42.2	47.4	38.2	34.0	34.1	44.0	31.2
Memphis General.....	48.5	38.9	35.1	39.0	27.9	34.2	33.5	47.4
Other hospitals.....	50.1	42.9	49.3	38.1	35.1	34.1	46.6	28.0
Home.....	24.0	22.0	26.1	21.5	22.6	28.5	36.8	19.0
White physicians.....	24.6	22.4	26.5	21.8	23.0	28.9	35.4	19.1
Midwives.....							(3)	
<b>Colored.....</b>	<b>99.3</b>	<b>102.3</b>	<b>95.9</b>	<b>85.4</b>	<b>88.0</b>	<b>67.9</b>	<b>64.7</b>	<b>66.2</b>
Hospital.....	103.2	132.9	85.1	103.4	102.9	102.8	79.4	83.8
Memphis General.....	93.5	123.3	82.2	100.7	101.9	100.8	78.6	78.9
Other hospitals.....	(3)	(3)	(3)	(3)	(3)	(3)	(3)	(3)
Home.....	96.3	79.6	103.9	76.5	79.5	43.8	54.0	54.9
White physicians.....	74.5	48.7	61.5	45.4	47.1	32.1	49.9	31.9
Colored physicians.....	130.3	138.9	158.1	139.5	147.9	78.9	70.4	152.1
Midwives.....	84.3	60.6	159.7	78.4	(3)	(3)	(3)	(3)

<sup>1</sup> Stillbirths per 1,000 live births.<sup>2</sup> Compiled from figures supplied by the Memphis Department of Health.<sup>3</sup> Rate not shown because number of live births was less than 100.

TABLE 39.—Place of death of infants dying in certain periods of the first year of life who were born to resident and to nonresident mothers in Memphis, Tenn., 1934<sup>1</sup>

Place of death	Total			Resident			Nonresident		
	First year	First month	Second to twelfth month	First year	First month	Second to twelfth month	First year	First month	Second to twelfth month
<b>Total</b> . . . . .	<b>517</b>	<b>316</b>	<b>201</b>	<b>354</b>	<b>232</b>	<b>122</b>	<b>163</b>	<b>84</b>	<b>79</b>
Hospital	427	273	154	271	192	79	156	81	75
Memphis General	289	189	100	212	144	68	77	45	32
Other hospitals	138	84	54	59	48	11	79	36	43
Home	90	43	47	83	40	43	7	3	4
<b>White</b> . . . . .	<b>258</b>	<b>160</b>	<b>98</b>	<b>140</b>	<b>97</b>	<b>43</b>	<b>118</b>	<b>63</b>	<b>55</b>
Hospital	232	146	86	114	83	31	118	63	55
Memphis General	95	62	33	56	35	21	39	27	12
Other hospitals	137	84	53	58	48	10	79	36	43
Home	26	14	12	26	14	12			
<b>Colored</b> . . . . .	<b>259</b>	<b>156</b>	<b>103</b>	<b>214</b>	<b>135</b>	<b>79</b>	<b>45</b>	<b>21</b>	<b>24</b>
Hospital	195	127	68	157	109	48	38	18	20
Memphis General	194	127	67	156	109	47	38	18	20
Other hospitals	1		1	1		1			
Home	64	29	35	57	26	31	7	3	4

<sup>1</sup> Compiled from figures supplied by the Memphis Department of Health.

TABLE 40.—Place of birth of infants dying in certain periods of the first year of life in Birmingham, Ala., 1930-34<sup>1</sup>

Year	Infants dying in first year of life											
	Total				In first month				In second to twelfth month			
	Born in city		Born elsewhere		Born in city		Born elsewhere		Born in city		Born elsewhere	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
TOTAL												
1930.....	404	90	40	10	255	99	3	1	149	112	37	25
1931.....	336	91	30	9	216	99	2	1	120	92	28	23
1932.....	322	90	32	10	205	98	4	2	117	88	27	25
1933.....	320	89	35	11	205	96	8	4	115	88	27	23
1934.....	366	91	32	9	231	98	4	2	135	107	28	21
WHITE												
1930.....	168	81	32	19	106	97	3	3	62	33	29	47
1931.....	171	87	22	13	119	99	1	1	52	31	21	40
1932.....	142	84	23	16	96	96	4	4	46	27	19	(2)
1933.....	143	82	26	18	98	93	7	7	45	26	19	(2)
1934.....	170	84	27	16	110	96	4	4	60	37	23	38
COLORED												
1930.....	236	97	8	3	149	100	1	1	87	79	8	9
1931.....	165	95	8	5	97	99	1	1	68	61	7	10
1932.....	180	94	10	6	109	100	1	1	71	61	10	14
1933.....	177	95	9	5	107	99	1	1	70	62	8	11
1934.....	196	97	5	3	121	100	1	1	75	70	5	7

<sup>1</sup> Compiled from figures supplied by the Birmingham Department of Health.<sup>2</sup> Percent not shown because number of deaths was less than 50.

For corresponding figures for Memphis, Tenn., see table 17, p. 90.



TABLE 41.—Mortality in certain periods of the first year of life<sup>1</sup> among all infants dying in the city and among infants born in Birmingham, Ala., 1930-34<sup>2</sup>

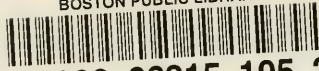
Year	Total		White		Colored	
	Total	Born in city	Total	Born in city	Total	Born in city
FIRST YEAR						
1930.....	77.7	70.0	54.7	44.3	110.8	107.0
1931.....	65.5	59.6	53.1	46.3	86.3	82.1
1932.....	64.9	58.3	48.9	41.0	87.5	82.7
1933.....	70.5	62.7	56.5	46.2	88.1	83.6
1934.....	77.3	70.6	62.5	52.6	97.5	95.0
FIRST MONTH						
1930.....	49.0	48.5	34.5	33.6	70.0	70.0
1931.....	42.1	41.7	37.0	36.7	50.7	50.2
1932.....	41.3	40.5	33.1	31.7	53.0	53.0
1933.....	45.1	43.4	38.7	35.9	53.3	52.8
1934.....	48.8	48.0	40.4	39.0	60.2	60.2
SECOND TO TWELFTH MONTH						
1930.....	30.1	22.7	20.9	11.1	43.9	39.9
1931.....	24.4	18.7	16.8	10.0	37.4	33.6
1932.....	24.6	18.5	16.4	9.6	36.5	31.3
1933.....	26.5	20.3	18.5	10.7	36.8	32.6
1934.....	30.0	23.8	23.0	14.2	39.7	37.0

<sup>1</sup> First year and first month, deaths per 1,000 live births; second to twelfth month, deaths per 1,000 infants surviving the first month of life.

<sup>2</sup> Compiled from figures supplied by the Birmingham Department of Health. For corresponding figures for Memphis, Tenn., see table 18, p. 91.



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